PALLETMANAGER

This printed manual supports users of PALLETMANAGER. The release, once installed, includes a full hyperlinked user manual that can be accessed directly from most screens. It also provides a range of screen specific Help, and a link to the Gower Optimal Algorithms web site (www.goweralg.co.uk) for additional support documents.

Users will note from the printed material that the online version is extensively hyperlinked, both within and between sections, and wherever possible the online version should be used in preference.

You should be also aware that online documentation is occasionally in advance of the printed format (reflecting new features etc.).

We wish you well in using the software and welcome feedback, ideally by email to support@goweralg.co.uk

G.O.A.L.

PALLETMANAGER

This manual describes in detail the use of the highly successful PALLETMANAGER software.

The full hyperlinked manual is automatically installed on disk as part of the installation process and can be accessed from screens within the application. Windows Help files are also available. As you will note from the printed material extensive hyperlinking of the material makes the use of the on-disk manual especially productive.

Technical questions on installation and dealt with in Section 2 and Appendix 1.

Additional technical and product information can be found at www.goweralg.co.uk

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SECTION 1

INTRODUCTION.

1.1 Background.

PALLETMANAGER is an invaluable tool for companies involved in any aspect of product design, packaging and packaging design, packaging rationalisation, or transport and warehouse planning.

The basis of the software is the maximisation of space utilisation - on the pallet, within a tray or tote box, in the warehouse or within a container / truck, taking account of a wide range of practical constraints as well as considering the costs associated with both packaging material and product movements.

It employs **unique optimisation algorithms** which are proven both in hundreds of companies worldwide and in the scientific literature. The basic concepts were first developed over 30 years ago by current staff at Gower Algorithms, and since that time continual user feedback and research have produced an advanced Windows suite of programs of benefit to companies large and small.

Whilst our web site (http://www.goweralg.co.uk/) and other literature mentions a large number of international clients one should stress that the benefits of our software products can be just as dramatic for companies employing just a handfull of staff.

We are a small dynamic family run company who believe in being in close contact with our clients. Development and support continue to be based in Swansea in the UK, and our staff have an in-depth knowledge of the capabilities of all our products. We are also able to carry out consultancy work in the areas of logistics and scheduling - please contact us if you have a problem you feel we might be able to assist with.

1.2 This Release.

This release combines the unique and powerful optimisation techniques proven in operation by many hundreds of companies over the past three decades with a modern, simple and slick Windows interface.

In further developing this release we have retained the logical solution sequence familiar to existing users, but enhanced operation so as to take full advantage of modern Windows facilities. User files from all previous releases are naturally supported. As well as providing a range of standard output options (printer, screen, cut and paste, graphics files, e-mail etc) the **Webbase** facility allows users to quickly and easily make their pallet specifications available on an Intranet / Internet or as a CD. French, German and Spanish language output can be selected as standard.

The software is modular and has four **primary modes of operation:**

PALLETISE	Calculation and display of optimal palletisation solutions for an existing case, pack or cylinder on a pallet or within a tray. This is the base module for all calculation modes**.**
COLLATION	Generation and evaluation of possible case sizes for a given primary unit collated using a selected packaging style.
TERTIARY	Investigation of the two stage collation of units, collating to form a display pack, then collating again to form the case.

CUBE	Analysis of options for packing a 'cuboid' (e.g. a shipper, tote box or a freight container) with identical units.

In each mode **optimal** solutions (proven both in practice and in the scientific literature) are produced. In addition the software includes a range of **unique and powerful** sensitivity analysis and 'what-if' tools providing a fast yet exhaustive investigation of potential specification changes. It also includes fully configurable pallet and case style databases and powerful case and shipper rationalisation tools, and uses a simple and effective Windows user interface. Every screen has access to one or more sources of online help.

Having produced a load specification a wide range of screen and printer report facilities are available. Inbuilt facilities allow any screen graphic to be cut and pasted to other Windows applications, or for a complete report to be placed on the clipboard with a single mouse click. Reports can be output (to printer, JPG file or PDF) in English, French, German or Spanish languages.

Specifications can also be saved to disk using the **STORE** module, and subsequently re-called for screen or printer output, or for re-analysis in **PALLETMANAGER** following specification changes. The **Webbase** module allows users to quickly produce a set of files for Intranet / Internet display or for a CD, either from existing STORE entries or during new calculations. Such entries can be viewed by anyone with a web browser - PALLETMANAGER is not required for this. The software has also been designed to link effectively with PDF generation software so that PDF files can be created from specifications and in a single click added as attachments to standard email software such as Outlook.

This version of **PALLETMANAGER** runs on all modern Windows systems without any further configuration.

Terminology within both Manual and Software

In this manual and within the software itself we have attempted to 'standardise' the terminology used in such a way that it will hopefully not confuse either existing or new users.

The term Unit or CASE is used throughout to denote the final unit which is arranged on the pallet or into a tray or tote box. This might be a cardboard case or a shrink-wrapped unit. In Palletise mode the size of the 'case' is specified by the user, in Collation mode the case size is calculated by **PALLETMANAGER** after considering the PRIMARY size, the number of primaries to be collated together, and the type of pack being utilised.

Thus the term PRIMARY is used to denote the units collated together to form a case, whilst the term SUB-PRIMARY is used to denote a unit which is collated together to form a primary unit, which itself is later collated to form a case. This is the subject of the TERTIARY module.

In packing Trays / Tote Boxes reports reflect the type of problem being investigated.

The User Manual.

This user manual provides introductory material for those making use of **PALLETMANAGER** for the first time, as well as sections devoted to a more in-depth description of each module. All the sections are extensively hyperlinked so as to allow for easy navigation through the material and each screen of the **PALLETMANAGER** application provides both local Windows help screens and direct access to the appropriate section of the manual.

Whilst the printed manual may seem rather thick the modular nature of the software does mean that only parts of it will be relevant to most users. Guidance on this is provided through the introductory material:

The Getting Started Guide - an 8 page introductory document.

A lengthier Guided Tour (Section 3) illustrates many of the facilities offered, and this section will be of particular interest to new users.

The Installation Instructions (Section 2) relate to both existing and new users.

Sections of the manual cover the various facets of **PALLETMANAGER** operation and the selection and operation of various modules.

As part of our development programme we would encourage you to write to us with any comments or suggestions you may have concerning the operation of the software and the facilities you would like to see incorporated.

Details of 'companion' products such as our **container loading software** - **CARGOMANAGER** - and our specialist slipsheet loading product SLIPSHEET MANAGER can be accessed via our website at http://www.goweralg.co.uk/

PALLETMANAGER provides users with optimal solutions to packing problems. However, as you will appreciate packing materials specifications, together with environmental and handling conditions are subject to continual change. Experienced staff should always ensure that the load plans produced are suitable for the practical environment in which they are to be implemented.

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SECTION 2 - INSTALLATION.

(Covers PC requirements, Installation Steps, File Security, De-Install/Move, Imperial Mode)

2.1 Introduction.

PALLETMANAGER uses a standard Windows Installer / InstallShield installation procedure that will be familiar to most PC users.

The software requires a Pentium PC running Windows 98 / 2000 / XP / NT / Vista / Windows 7. A display mode of at least 800*600 is required. In other resolutions (e.g. 1024*768 or better) additional report information is available to screen. Around 15Mb of disk space is required for installation. Over time an additional 15Mb of user files may be produced. Where the **Webbase** (Web database of specifications introduced in v7.2) is used additional space will be required as discussed in Section 14 of the manual.

PALLETMANAGER can be installed on a local or networked drive but is basically a single user product. GOAL (and our website) can provide suitable advice for multi-copy installations. The default installation folder suggested during the installation process is C:\PMNT (as with all previous releases), but any valid location can be used. The installation registers the application in the Windows registry (so it can be de-installed) but all application files are copied to the specified installation folder. Any **PALLETMANAGER** user datafiles found in the installation folder will be retained. All files created during a **PALLETMANAGER** session will normally be found either in the installation folder or in sub-folder JPGFILES found below the installation folder.

2.2 Installing PALLETMANAGER.

The CD supplied normally contains a copy of **PALLETMANAGER** together with trial copies of other software products (e.g. **CARGOMANAGER** / **SLIPSHEET MANAGER**). The CD will normally autostart when placed in the CD drive and the **Install Software** option can then be selected.

The CD allows **TRIAL** installations of any product to be carried out. These TRIAL installations (only) **MUST** always be installed on a **local (not network) drive** of your computer. The trial period is up to 21 days from installation.

If you are a **licensed user** of the software then, with the Licensed CD, will be a set of license codes (specific to the software product) which are needed when installing a fully licensed copy. A licensed user is able to successfully install the software on both local and network drives.

The CD can be used either as a complete new installation or (if you have a current license / support agreement) to update a previous installation. If you update an installation (in the same folder) then user configuration and database files from that release **will be retained.**

Installation Steps:

(1) With Windows running insert the installation CD. The CD will normally autostart and you are then able to to select the **'Install Application'** option to install PALLETMANAGER.

(2) If you are installing in **TRIAL** mode (you do not have a set of license codes for PALLETMANAGER) then you **must install the software on a local drive of your computer.**

An InstallShield Wizard will guide you through the installation process.

If the computer on which you are installing already has a copy of the **same version** of the application installed then **you may be prompted to Modify / Repair / Remove the application**. Unless otherwise advised **you should select Repair** to update files accordingly. [The above dialogue is standard with Microsoft Installer and cannot be changed by us]

You will be invited to install into folder C:\PMNT (as with the previous release). When the software is installed in the same directory / folder as a previous release, user created configuration and data files **will be retained**. If an alternate location is selected then, if required, user files from the earlier release can be manually copied to the new folder for use with this release. Full details of the files concerned are given at the end of this section.

A standard part of the Microsoft Installer routines is the deletion of any previous version of the application (just the executable files, not any user files), prior to the installation of the new release.

Note the comments below regarding complete removal of trial or full systems.

(3) The final installation step requires you to run the software. Select PALLETMANAGER using the appropriate Start / Programs entry which will have been added during installation.

When you run the software for the first time you **may** be invited to enter License Codes (this will depend on the CD version). **TRIAL users** are instructed on screen to just select 'Continue' and not attempt to enter details into the license screens.

If License Codes for the software product have been provided then these must be entered **exactly** as given and then 'Continue' selected.

Very Important!!!

When this is done correctly then you are immediately informed that the software is '**Fully Licensed**'. Otherwise you will be informed that the software is in 'Trial mode'.

Licensed users must ensure that the 'fully licensed' message is displayed as described above - otherwise the software may fail on first use with a 'time expired' message, or at the very least will fail during the first few days of operation.

(4) Having completed the above, and if appropriate received a 'fully licensed' message, installation is complete.

After completing this process you are faced with the Main PALLETMANAGER Entry menu. Buttons provide access to the full on-disk manual as well as to the GOAL website at www.goweralg.co.uk .

You may now select to **Exit** from the software unless you are ready to try the software for the first time. In first use the **New Run** button leads to the main calculation modes of PALLETMANAGER (See Section 3 - The Guided Tour). An entry PALLETMANAGER will have been added to your Start / Programs entries. This executes the PALLETMANAGER startup program runpm.exe.

2.3 File Security and Backup

During your use of PALLETMANAGER a number of files in the installation folder (C:\PMNT by default) will be updated / created to reflect your own company standards and to hold your own palletisation data. It is important that security copies of these files be taken regularly.

The complete list of files which will change is given below and overleaf, (together with their functions), though not all of these files will exist on every installation.

DEFAULT (holds pallet sizes); PACKTYPE (holds case style details)

CASEBASE.DAT (case rationalisation database); STORFILE.DEL (store module data)

STORFILE.DAT (store module data); STORFILE.IDX (store module data)

COMPRESS.DAT (case compression data); CUBEBASE.PAL (cube shipper database)

PMCONFIG (configuration file)

In addition, those using the Webbase module (Specifications held in a format suitable for web / CD display using a browser), will create (often a substantial) numbers of files in the sub-folder JPGFILES found beneath the installation folder. ***ALL the above files should be backed up up to a secure location..***

2.4 De-Installation / Moving.

When installed a PALLETMANAGER entry is provided to Windows so that it can be deleted from a machine by selecting *Start / Settings / Control Panel / Add or Remove programs*. If this is done then some user configuration / database files in the installation folder may not be automatically removed and would need to be deleted using Windows Explorer.

In some rare situations you may find that an entry for any previously installed version of PALLETMANAGER remains on the start menu. This can be removed by using the **right** mouse button to highlight the unwanted entry and then selecting **Delete**. (Do not remove it using add/remove in Control Panel - this would remove some user data files and some of the latest application files)

If moving the software between machines then you could obviously re-install the application on the new machine from CD and then copy over the files detailed in 2.3 above. Alternatively copying the whole PALLETMANAGER folder (and any sub-folders) over to the new machine **will** create a suitable working system. The startup file for PALLETMANAGER is **runpm.exe**.

2.5 Imperial Mode.

As standard PALLETMANAGER operates in metric mode with dimensions being entered in mm. / Kg etc. It is possible to configure PALLETMANAGER so that all data input is in inches (e.g. 12.7 inches) / lb and appropriate calculations / display in these units is then used throughout the application. If configuring in this mode you should note the following points.

- If you are running trial software (limited duration trial) then although imperial configuration can be carried out as described below on the software, once the trial period is over then the software will be inoperative. (Metric systems continue to operate after the trial period is over using a fixed non-standard pallet size).
- The vast majority of PALLETMANAGER features can be used in imperial mode, but for technical reasons those of Cubebase, CaseSel and Casebase will not be available.

Setting Imperial Mode:

- Install PALLETMANAGER and run it for the first time.
- From the Opening Menu select the final option: **METIMP** and follow the appropriate steps to change the software to Imperial mode.
- The METIMP 'switch' can be used to revert to Metric mode, however users are warned that repeated switching is not recommended.

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SECTION 3 - A Guided Tour.

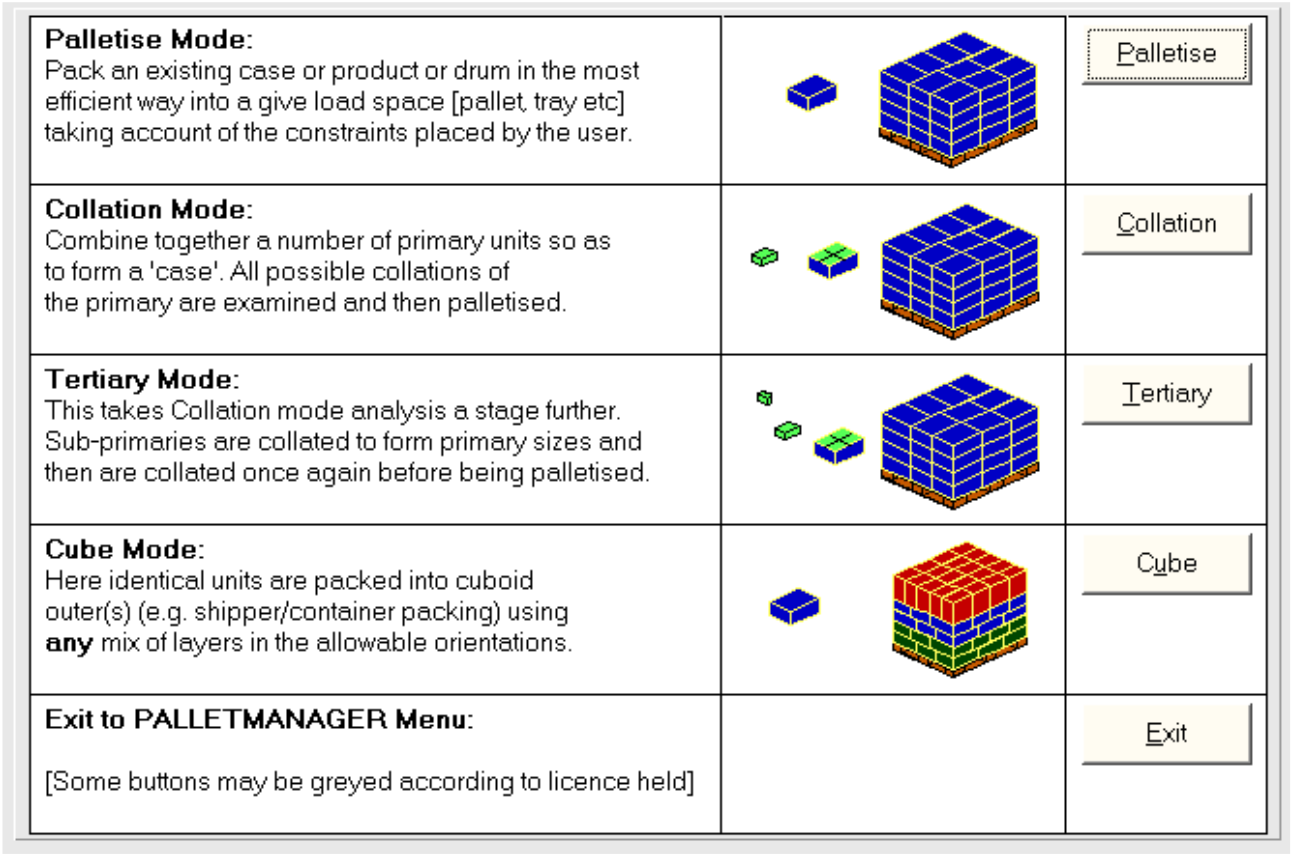
(Covers: Introduction, Example 1 - Palletise, Example 2 - Collation, Improving Solutions)

3.1 Introduction.

Here we introduce you to some of the basic features of PALLETMANAGER and provide you with link / hyperlinks to more advanced material which may be relevant as you begin to exploit the software to its full potential. Two examples are given - one of which is presented as a two page 'Summary' whilst the second is given full detailed treatment.

- Start PALLETMANAGER from the **Start / Programs** PALLETMANAGER entry.
- After an introductory screen the Opening Menu Screen (Screen 0) is shown. On this occasion, as on most occasions, select **New Run** from this menu.

Other entries provide access to database facilities (or the online manual) and will be described later. When selected the **Mode Selection Screen (Screen 1) is displayed**:

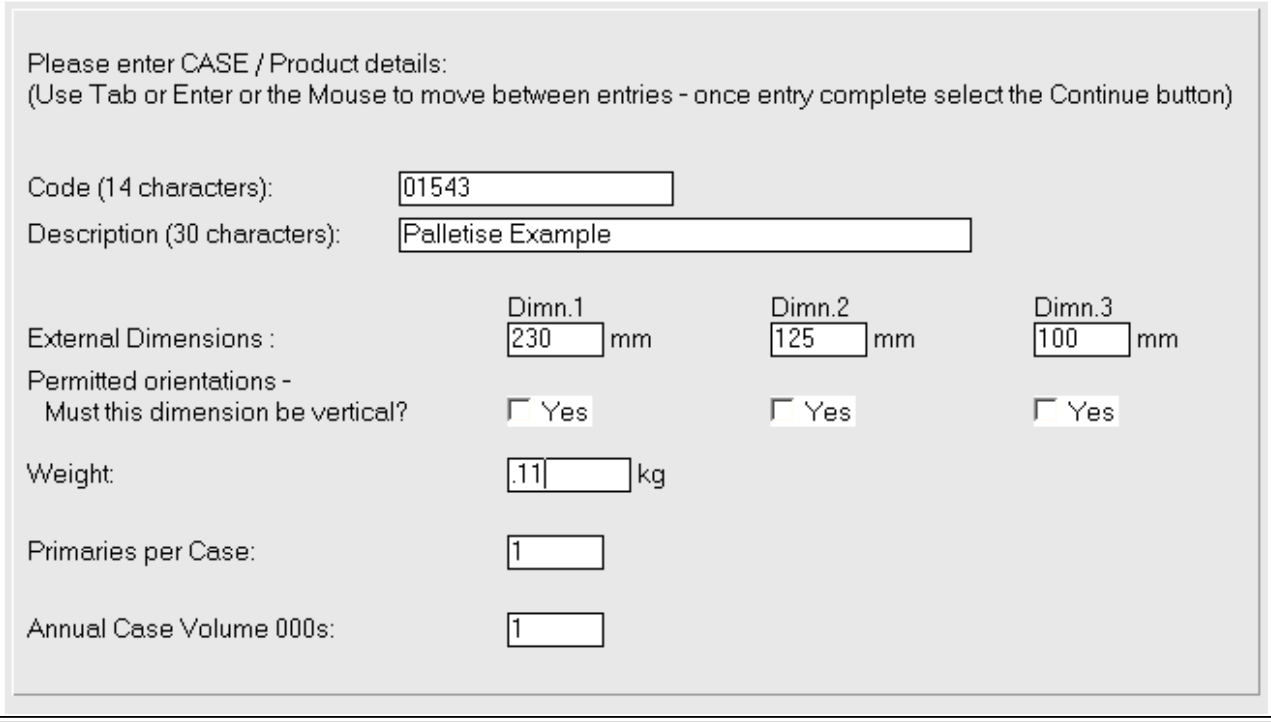


On trial and evaluation copies of the software all the above entries will be shown. On purchased copies a subset appropriate to your needs may be shown. The above screen allows you to select which **Mode of Operation** you wish to use. The text and graphics illustrate the basic functions of each. In practice the input and display screens associated with different modes of operation are very similar to each other.

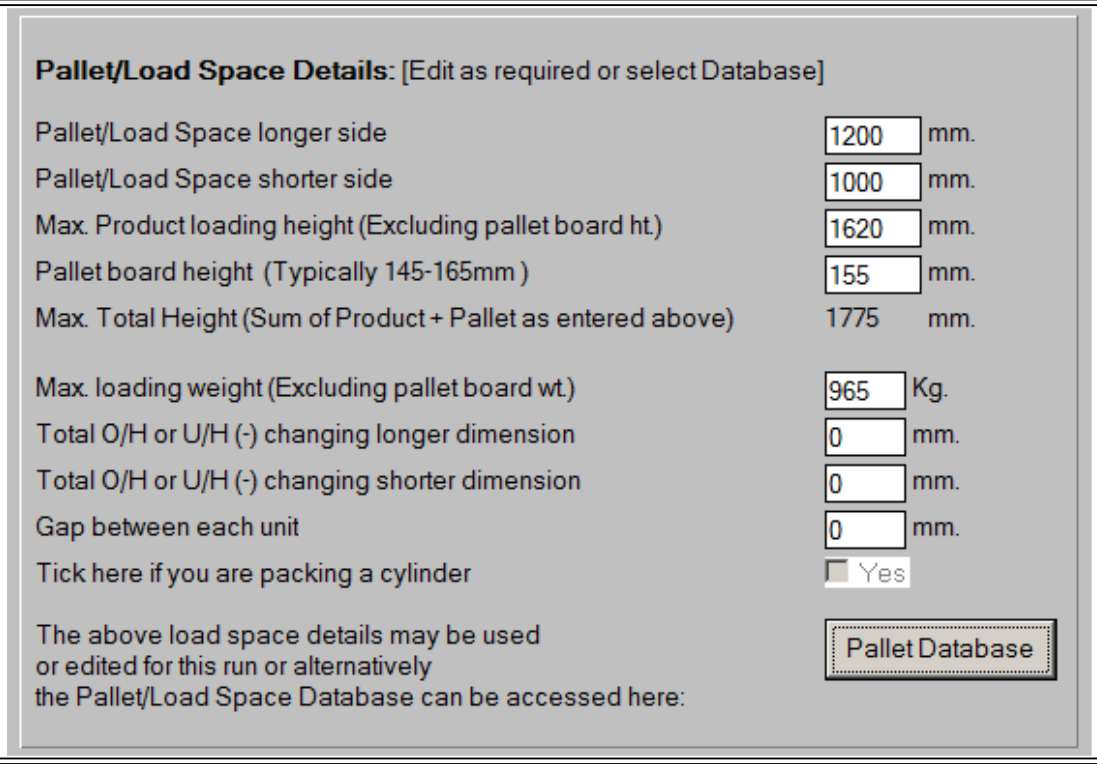
3.2 Example 1 - Palletise Mode (Summary treatment).

Examine the optimal pallet layouts available for a case of size 230 * 125 *100 on a pallet of size 1200 *1000 * 1620.

Solution: From the opening menu select **New Run** and then from the Mode Selection screen (previous page) select **Palletise**. Enter case details for the problem as below:



The Code and Description entries are your identifiers, primaries / case and case volume values the default entries (Used for costing movements if required). Select **Continue** and Pallet Default values are displayed. On this occasion these match the problem definition. Normally you will configure the Pallet Database (see Section 4)

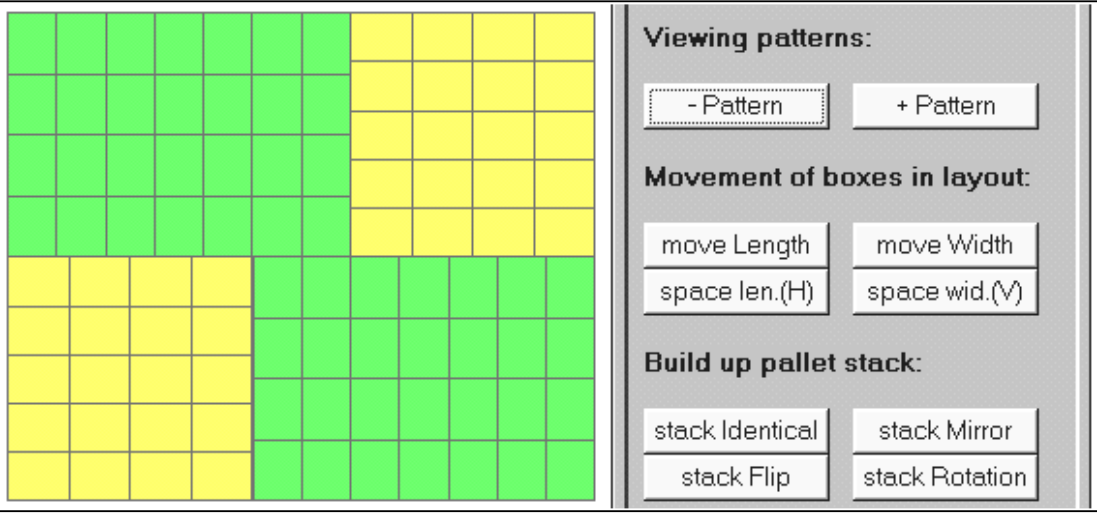


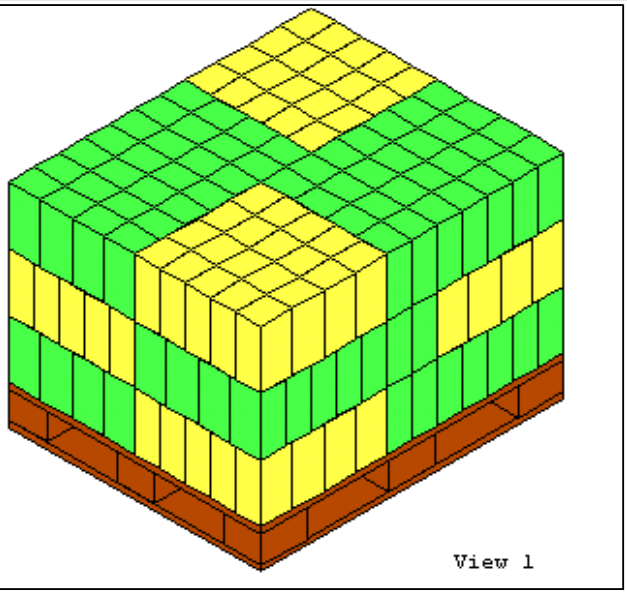
Select **Pack** and the optimal solutions for this problem will be calculated.

Above we allowed any case dimension to be vertical - hence 3 optimal solutions:

Ref No	Extnl Case Dimensions			Colln	CASE Matl	Wt.	TOTAL Cases	Layer	% Fill Area	Vol	+Layer Ht.	Wt.	Cost Total
1	125	100	230	N/A	N/A	0.1	672	7x 96	100	99	220		0.045
2	230	125	100	N/A	N/A	0.1	640	16x 40	95	94	80		0.047
3	230	100	125	N/A	N/A	0.1	612	12x 51	97	90	5		0.049

We highlight with the mouse Solution 1 and then select **layout**. The first of 46 optimal pallet layouts for this problem is shown. The **+ / - Pattern** buttons allow us to browse.





After viewing the patterns available the one most suitable for creating the 3D pallet stack is selected and (here) 'Stack Mirror' is selected to produce the picture shown here.

Assuming this is acceptable you select **Print / View** and proceed to a menu where detailed reports to screen and printer are generated.

Any (or all) screen graphics can be cut to the Windows clipboard and pasted into Windows applications. The software also has an inbuilt Store database.

The above example provides a very quick and basic overview of operations. In practice it will usually be necessary to investigate the problem rather more thoroughly using some of the powerfull analysis features of the software. A summary of some PALLETMANAGER facilities to assist you further can be found in Section 3.4, which also provides links to the manual pages where further information can be found.

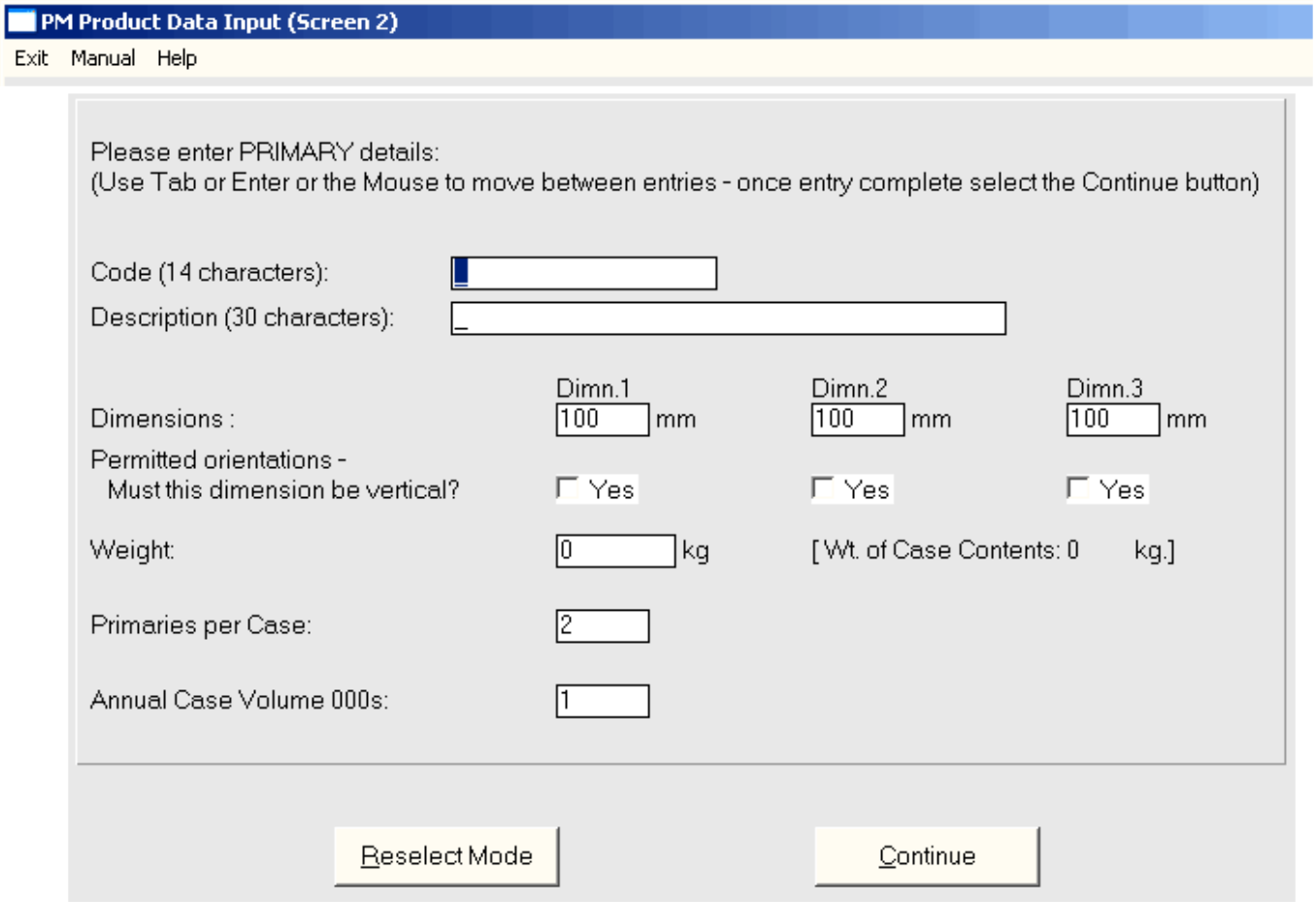
3.3 Example 2 - Collation Mode (Detailed examination).

The treatment of this example does **not** assume that you have necessarily examined or tackled Example 1. In using Collation mode you will gain most of the skills needed to use all other modes of operation.

Tutorial - Data Entry.

Collation mode is used when you have a product (termed within PALLETMANAGER as a primary unit), a number of which need to be collated together to form a distribution unit (Case, shrink wrap unit etc) which must then to be palletised.

On selecting the **Collation** button the Primary Data Input Screen (Screen 2) is displayed:



The top menu bar of this screen, like nearly all others, provides access to 3 functions:

Exit - Finish with the current examination and return to the main menu.

Manual - Access the on-disk copy of the manual. This will load your web browser software and open the manual at a section of that manual appropriate to the problem type and screen you are on.

Help - This will access a Windows helpfile which is designed specifically to answer questions about the ***specific screen*** you are on.

Thus the level of software support available from all screens within the application is considerable.

The lower portion of screen invites entry of details on the primary unit (which will then be collated and the resultant unit packed optimally on a pallet).

The **Code** and **Description** are presented on reports you will produce and are also used if you save the result of your analysis to disk for later recall using the **Store** module.

On entry to this screen the entry cursor will be positioned ready for a Code to be entered.

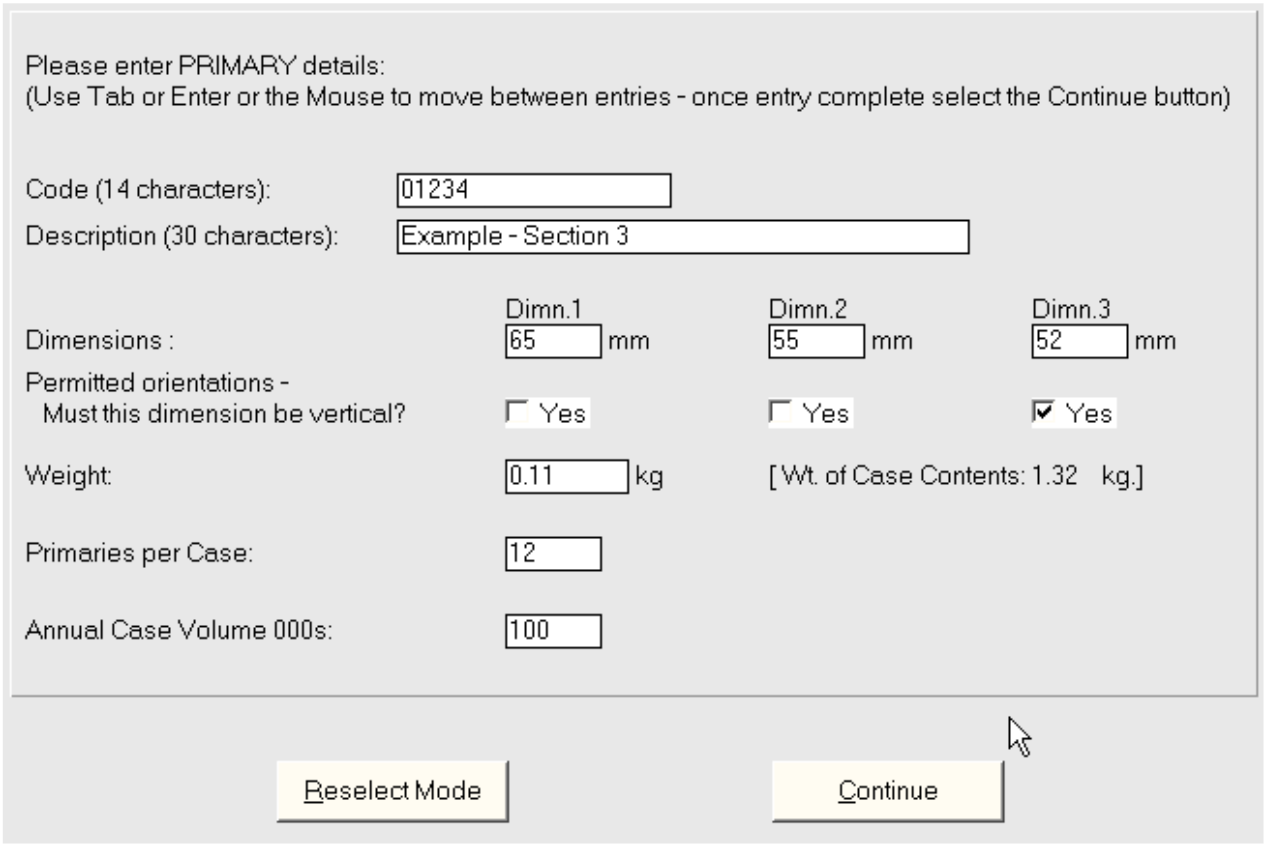
On all screens, you can use the mouse to position the entry cursor in a particular entry box and then type in the entry. Having completed the entry you can use **either** the Tab key or the Enter key to complete the entry or use the mouse to move to another entry field. When using the Tab or Enter keys the entry cursor will automatically move to the next entry field. (On some screens the up/down arrow keys may also be used).

Tutorial - Collation problem and data entry.

We will examine the following problem:

Collate a primary unit of external dimensions 65mm * 55mm * 52mm which weighs 0.11Kg in 12's into a cardboard case and then palletise the case in the most efficient manner. We will assume that the 52mm dimension **must** be placed vertically in the case.

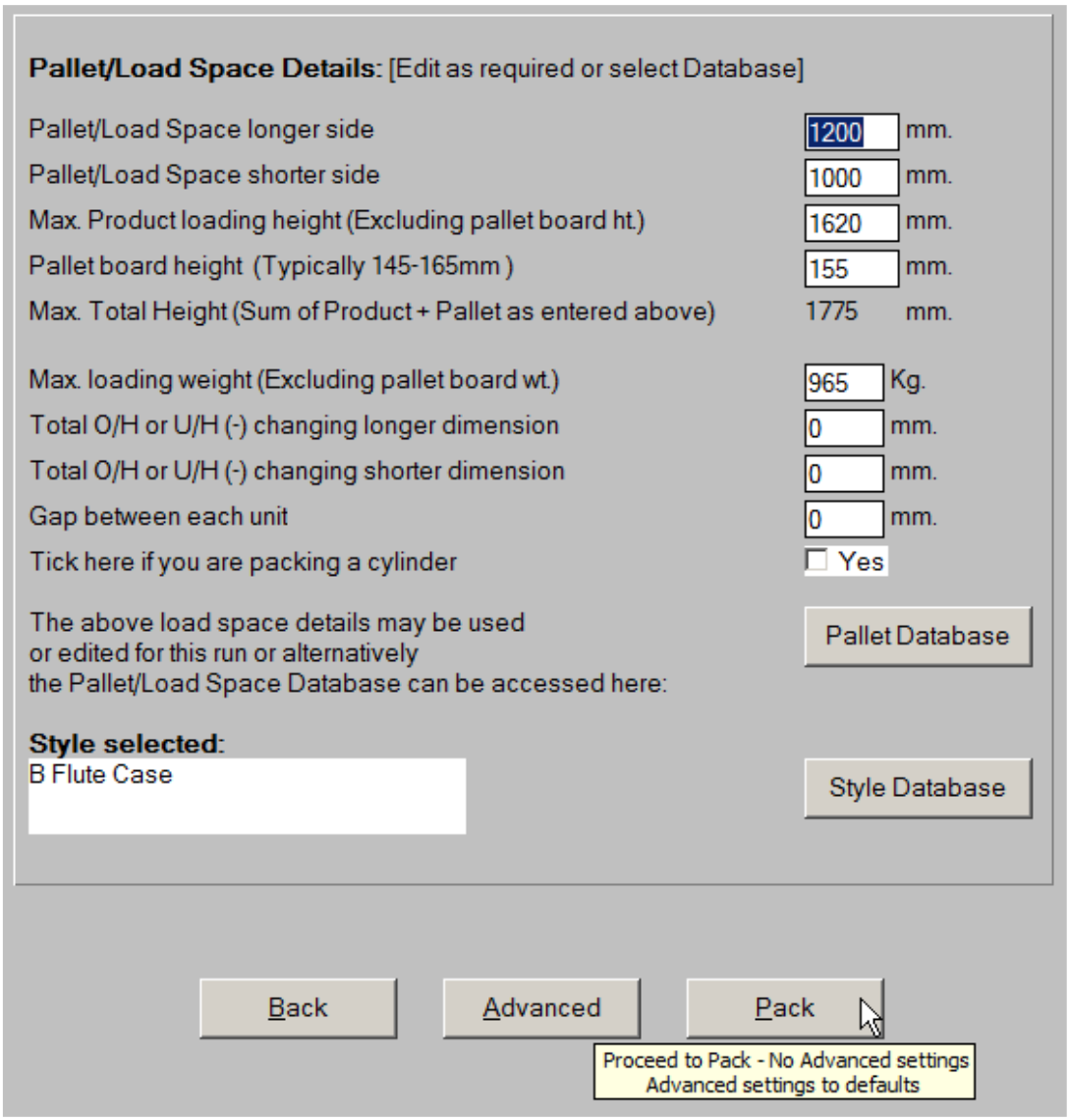
After entry of these details the screen is as below:



(Suitable Code and Description details have been added). The annual case volume entry is used in costing as is described below.

A **tick** has been selected for the 52mm dimension to be vertical. The 3 primary dimensions can be input in any order (though logically they might be assumed to be, in sequence, primary length, width and height).

Having completed entry of the primary information **Continue** is selected to proceed to Pallet and Style Selection screen (Screen 3). This is shown below:

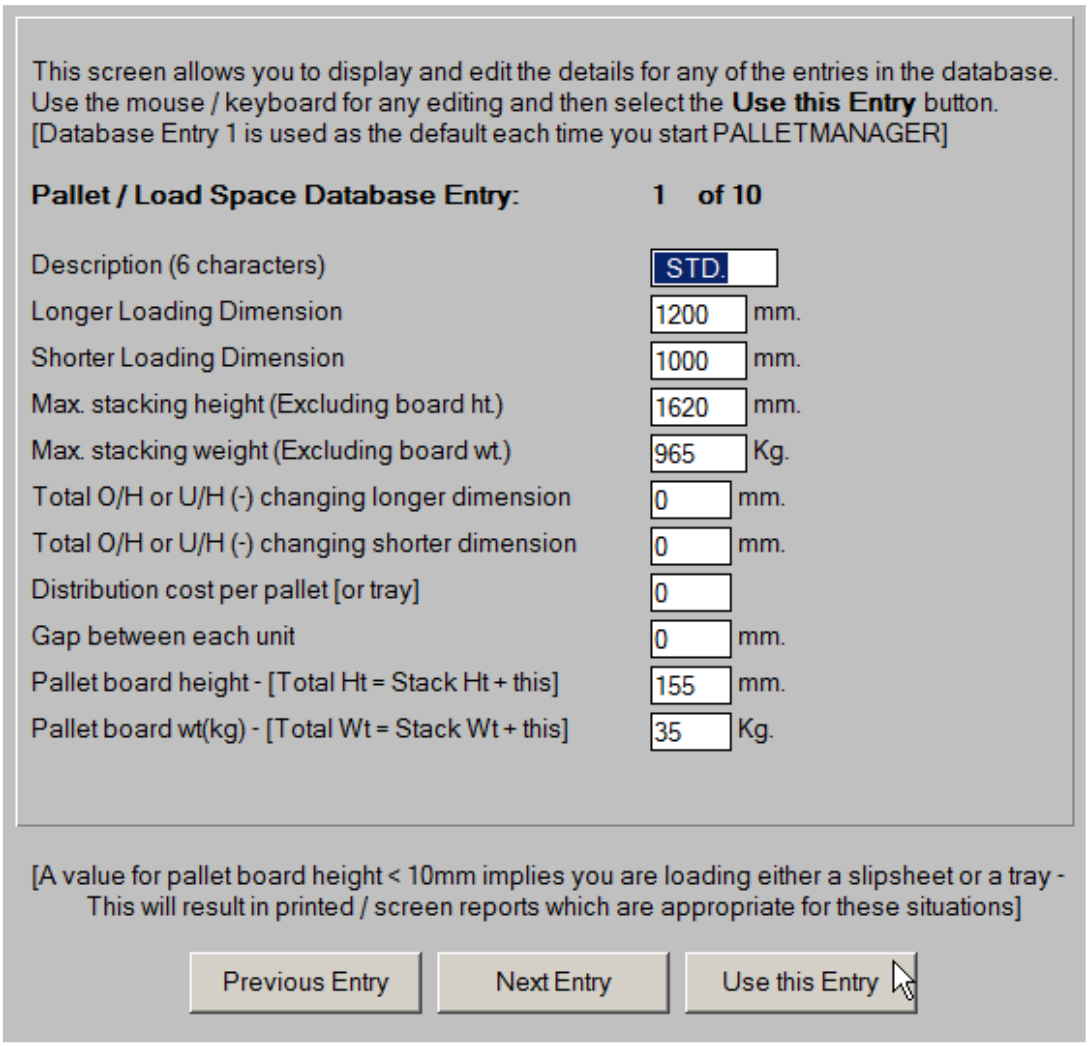


On entry this screen will already be completed. Details of a Pallet (here 1200 * 1000 * 1620) and of a Case Style (a B flute case) are shown. These are **Default** entries which we will use on this occasion. We could edit any of the details shown for a specific run.

PALLETMANAGER has user configured databases for both Pallet Details and Case Details and here the default entries (Entry 1) from each of these databases have been recalled. You will be shown in **Section 4** of this guide how to configure Pallet and Style detail databases to be appropriate to your company.

Although on this occasion the above entries are suitable for our needs the effect of selection both the Pallet / Load Space Database and Style Database buttons is illustrated below.

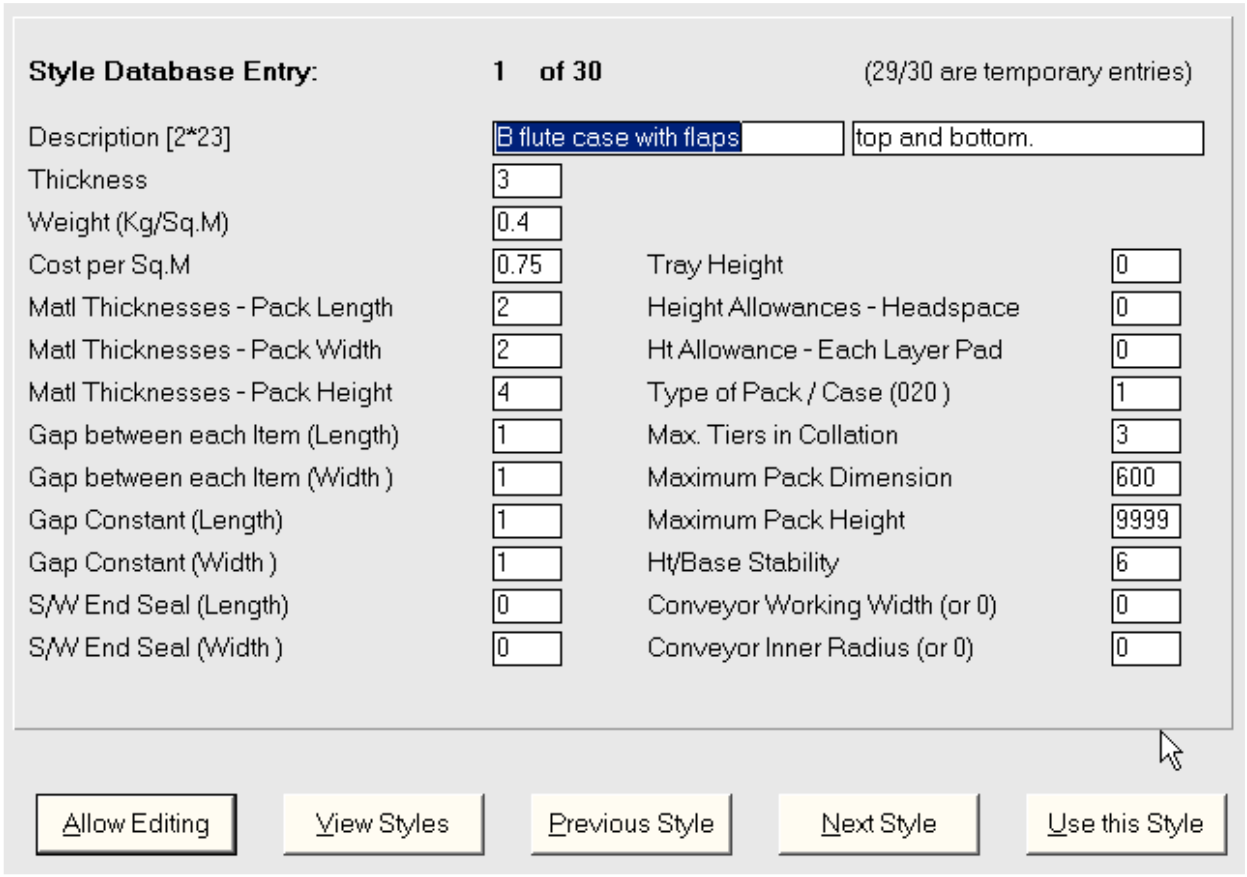
If we select from Screen 3 the **Pallet Database** button the following screen is displayed:



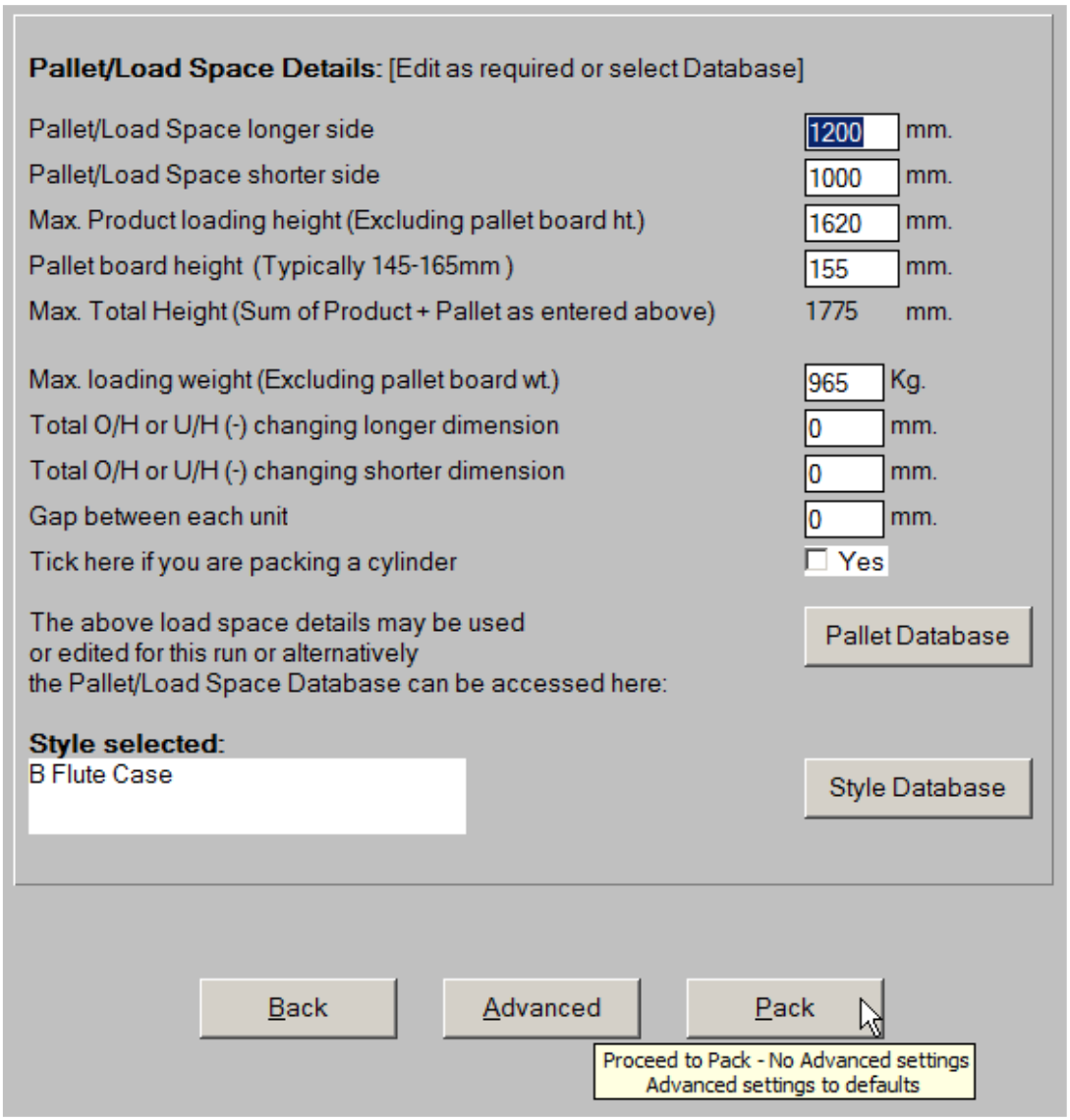
This displays Pallet 1 (of 10) from the Pallet / Load Space Database (here the default pallet). The details shown are the same as were displayed on Screen 3. We could edit these or browse through the other pallet sizes held in the (user defined) database. When viewing Pallet 1 select **Use this Pallet**.

Whilst in this instance we are tackling a problem in which the load space is a pallet, PALLETMANAGER can equally well tackle problems of loading product into a tray, tote box or even a shipping container. Section 16 of this manual illustrates how a tray or tote may be specified as the load space in a similar manner to the pallet described above.

In a similar manner we can look in more detail at the Style database by selecting **Style Database** from Screen 3. Following a 'warning' information screen, the following screen is displayed:



Once again the default entry (Style 1) is displayed together this a considerable amount of detail relating to this Style. The configuration of this database is covered in detail in **Section 4** of this manual. For the present we select **Use this Style** and return to Screen 3 (shown earlier and repeated below):



As we are happy with the details shown we can enter the Calculation phase of PALLETMANAGER by selecting **Pack**. If however we wished to change details of the primary then we could select Back to return to the Primary Data Entry screen (Screen 2). Most screens in the software allow you to move quickly backwards to previous screens. An Advanced Options button is also available above. This provides access to a range of more advanced functions which are discussed in detail in Section 5 of the manual. They include such facilities as alternate collation quantities and ranges, advanced sensitivity tools etc. Note that the option to select 'Packing a cylinder' on the above screen will only be available when two or more of the product dimensions are equal.

Tutorial Results Display.

Having selected **Pack** from the above screen PALLETMANAGER will then:

- Examine how the given quantity (12) of the primary can be collated together in all possible ways. (e.g. 12*1*1 ; 6*2*1; 3*4*1 etc, etc)
- Determine the case size (or in other instances shrink wrap etc) resulting from all such collations.
- Exclude those cases sizes which do not meet user constraints (specified on the above Style Screen). These might include dimensional limits, stability, layer limits, conveyor limits etc).
- For those cases which meet user constraints determine the **optimal way** in which a layered pallet stack may be produced.

- For each of these solutions (i.e. for each case size), determine the cost of adopting the solution. This includes distribution and case material costs as defined (by the user) in the Pallet and Style databases (these can be set to zero if required).

- Rank the solutions and present them in cost order on the Results Summary Screen:

Load Space available: 1200 * 1000 * 1620 ht.
Buttons such as Layout will calculate and display results for the highlighed entry.
Please highlight any line of the result you are interested in and then select the appropriate button.

Ref No	Extnl Case Dimensions	Colln	CASE Matl	CASE Wt.	TOTAL Cases	TOTAL Layer	% Fill Area	% Fill Vol	+Layer Ht.	+Layer Wt.	Cost Total
1	138 118 168	2x2x3	.15	1.4	639	9x 71	96	89	60	14	15.677
(Colln. Qty: 12; Pri/Pallet: 7668)											
2	230 72 168	4x1x3	.14	1.4	621	9x 69	95	88	60		15.703
(Colln. Qty: 12; Pri/Pallet: 7452)											
3	204 118 116	3x2x2	.15	1.4	624	13x 48	96	89	4		16.110
(Colln. Qty: 12; Pri/Pallet: 7488)											
4	270 62 168	4x1x3	.15	1.4	630	9x 70	97	91	60	2	16.216
(Colln. Qty: 12; Pri/Pallet: 7560)											

On entry the 'best' solution is highlighted. You can browse through the results for other case sizes (using the scroll bar, arrow keys, Home, End and PgUp/Dn keys). You can also use the left mouse button to highlight any of the other entries for further examination.

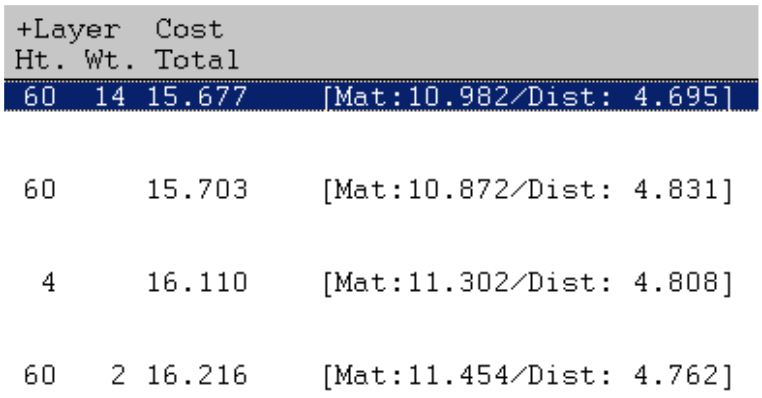
If we examine the **above highlighted entry**: It fits 639 cases on the pallet, each case being 138mm * 118mm * 168mm. Nine layers of 71 cases are used. 96% of the pallet base area is covered but height utilisation is not that good as there is over 100mm left unused on top of the pallet - an extra 60mm on our height limit would allow an extra layer to be accommodated, and in addition we would need to relax our pallet weight limit by 14kg.

Other entries in the table also deserve consideration. For example **Entries 2 and 4** are both constrained by the same height restriction and should an extra 60mm be available then both would be able to accommodate an extra layer of cases. **Entry 3** is even more interesting. This provides a good pallet area utilisation (96%) and only requires an extra 4mm in height to allow an extra layer. Whilst it is currently more costly than Entry 1 (£400/yr), given the extra height (4mm) then it might still prove a better solution.

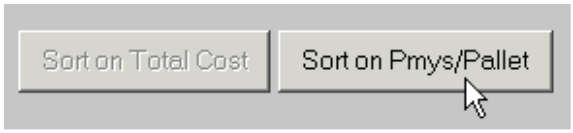
We should of course examine entries lower in the list in a similar manner.

We should also consider in a little more detail the Cost Figures presented and what they mean: In this example we stated on the data entry screen that 12 primary units were to be collated together to form a case, and that we expected to ship some 100,000 cases of the product / year. For a given number of cases / pallet this implies the need to store and transport a certain number of pallets. In addition we also need to considered the likely cost of manufacturing 100,000 cases.

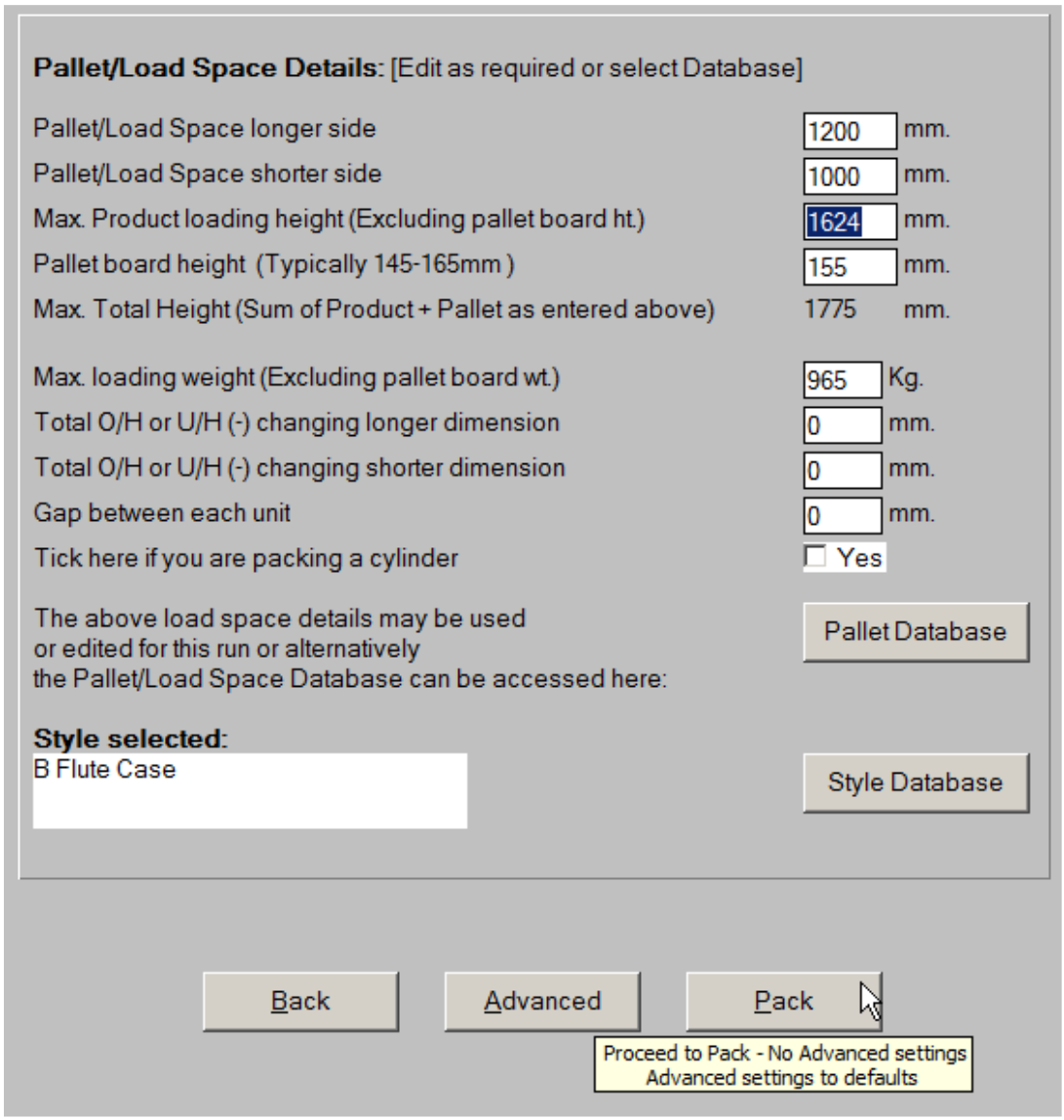
Each line of results in the above table gives us a **case size** and **a number of cases / pallet**. PALLETMANAGER uses this information to calculate a distribution costs (based on a cost / pallet - held in the pallet database entry - and the number of pallet loads required), and a case materials cost (based on the case style and a cost sq. m of board as held in the Style database). If your screen resolution allows then these separate costs will be presented to the right of the tabular display as shown below:



The initial default ordering of the display ranks the solutions according to the **total cost**. This can result in the least cost solution not actually fitting the most units / pallet. The latest version now provided an additional set of buttons on the tabular results screen (Screen 5), so that the display can be 'toggled' between the traditional cost based listing and one sorted according the the quantity of product / pallet. When using the latter the result at the top of the listing may fit more primaries / pallet but may cost a little more overall due to differences in the costs of the case - different case designs holding the same quantity of product may require very different amounts of packaging material.



We can also quickly examine the influence of a height limit change in either of two ways. One, which will be described in detail in Section 5, would be to use the Advanced Options available on this screen. However just as quickly on this occasion we can select the **Back** button (which returns to the Pallet / Style Details screen (Screen 3). On that screen (shown below) adjust the height limit from 1620 to 1624 (to allow the extra 4mm) and then select **Pack**.



The results using the slightly bigger height limit are calculated and displayed as below:

Ref No	Extnl Case Dimensions	Colln	CASE Matl	CASE Wt.	TOTAL Cases	TOTAL Layer	% Fill Area	% Fill Vol	+Layer Ht.	+Layer Wt.	Cost Total
1	138 118 168	2x2x3	.15	1.4	639	9x 71	96	89	56	14	15.677
(Colln. Qty: 12; Pri/Pallet: 7668)											
2	230 72 168	4x1x3	.14	1.4	621	9x 69	95	88	56		15.703
(Colln. Qty: 12; Pri/Pallet: 7452)											
3	204 118 116	3x2x2	.15	1.4	672	14x 48	96	96	116	29	15.766
(Colln. Qty: 12; Pri/Pallet: 8064)											
4	270 62 168	4x1x3	.15	1.4	630	9x 70	97	90	56	2	16.216
(Colln. Qty: 12; Pri/Pallet: 7560)											

These confirm that Case 204 * 118 * 116 (original Entry 3) is indeed able to fit an extra layer onto the pallet and now accommodates 672 cases / pallet - the best of all the 11 solutions. **However**, it is <u>still</u> ranked in 3rd place (though with costs close to Entry 1) - the extra costs of packaging material to construct this case design (based on material area) still outweigh the savings in transportation costs.

This example illustrates the importance of both Case Material and Pallet Transportation costs on the selection of the least cost option. These are defined by the user in the Pallet and Style databases (discussed in

Section 4) and mean that the case design which maximises cases / pallet is not necessarily the most economical design.

It is of course possible to configure the database entries so as to ignore costs and thus rank solutions purely on the basis of pallet fill - though the implications of this action needs to be appreciated. Also it is essential that dialogue takes place with case designers to ensure the price differential between case designs is as suggested. In **Palletise** mode - where the pallet size is already defined - Pallet utilisation and transportation costs are naturally equivalent and thus ranking then is on a cases / pallet basis.

The example also illustrates the need to examine the tabular results carefully. Here, by allowing just 4mm extra height an 8% loading improvement has been obtained for at least one solution. Not only should the top 4 entries (as shown here) be examined, but also other entries further down the ranking which, with some small change to constraints, could result in a dramatic improvement in solution quality.

A number of more advanced techniques to obtain improved solutions are summarised in Section 3.4 and discussed in detail in Section 5.

It is also important to emphasize that every entry in the above tables of results represents the optimal packing for that given case on the stated pallet. The geometric characteristics of the case determine whether a good or poor packing can be achieved. In the above table the entry ranked last in the table only fills 78% of the pallet area - yet this is indeed the best that can be achieved!

Tutorial - Layout and Collation Display.

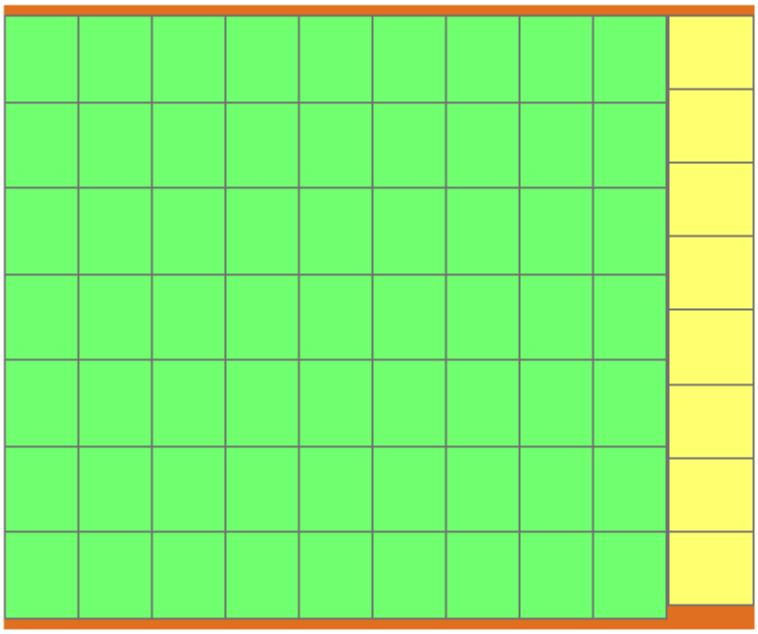
From the above tables of results it seems likely that either the cost efficient Entry 1 or the volume efficient Entry 3 are likely to be the most suitable solutions.

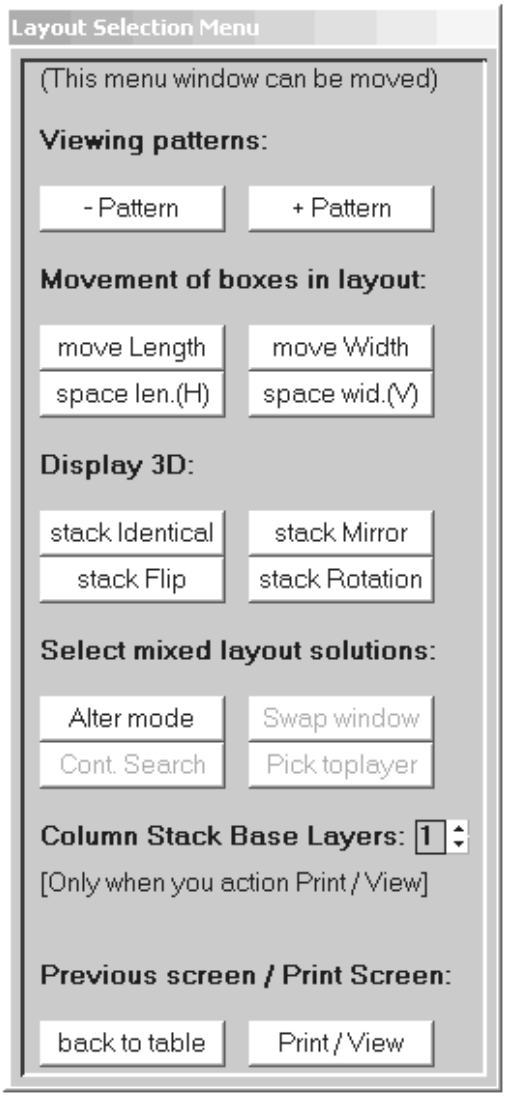
For each entry there will be between 1 and 100 different geometric arrangements of the given case on the pallet, each of which provide exactly the same optimal packing quantity. Some of these arrangements will be good from a stacking point of view whilst others may be highly unstable.

If we **highlight Entry 1** and then select **Layout** the Layout Selection screen (Screen 6) is displayed as below.

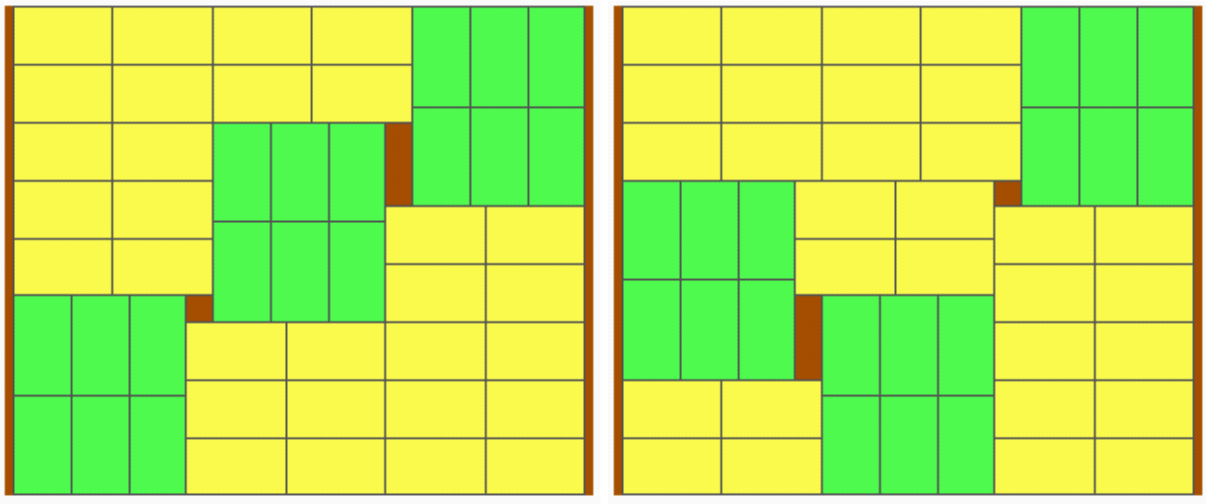
This presents a 2D view of just one of the 38 arrangements of this case size on the pallet which provides this optimal packing solution. You can use to **+ Pattern** and **- Pattern** buttons at the top right of the screen to examine a few of the available arrangements. Some are clearly better than others from a loading and stability viewpoint. Controls are available on screen to move and/or centralise cases in the arrangement before 'building the pallet stack' - this is discussed below and in Section 5

```
(Use left mouse button to mark an area for Cut & Paste)

Ref. No.          1  (Length dimension shown across screen)
Layout No.        1   of   38     (Type     B  )

Overhang on Length  :                 0
Underhang on Width  :                34
```





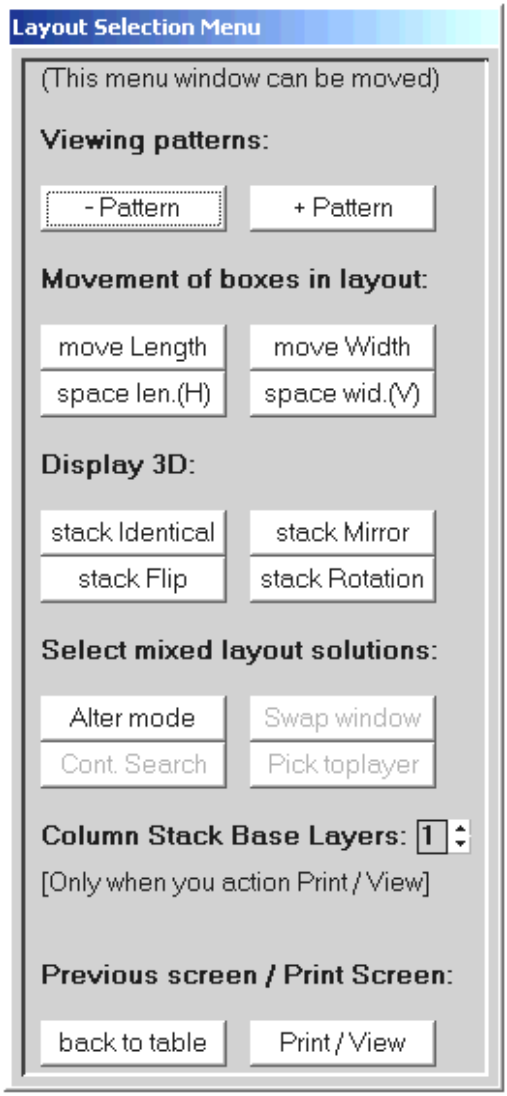
On this occasion we will select the **back to table** option, highlight **Entry 3** in the table, and then examine the **Layouts** for this volume efficient entry. Just two optimal arrangements are available for this problem - these are shown below.



Whilst both are a little complex the left hand one should certainly provide a stable stack.

[If we were concerned that the layout was indeed too complex PALLETMANAGER is, of course, able to provide you with simpler solutions fitting one case / less layer via the Advanced option on Screen 5]

From the menu adjacent to diagram the following actions can be used to build up a 3D pallet stack. (This menu like some others can be moved around the screen using the mouse).



The topmost buttons allow you to browse through the various layouts available for the highlighted table entry.

Sometimes the boxes in the layout need centralising on length or width or spacing out along that dimension. These buttons perform such actions.

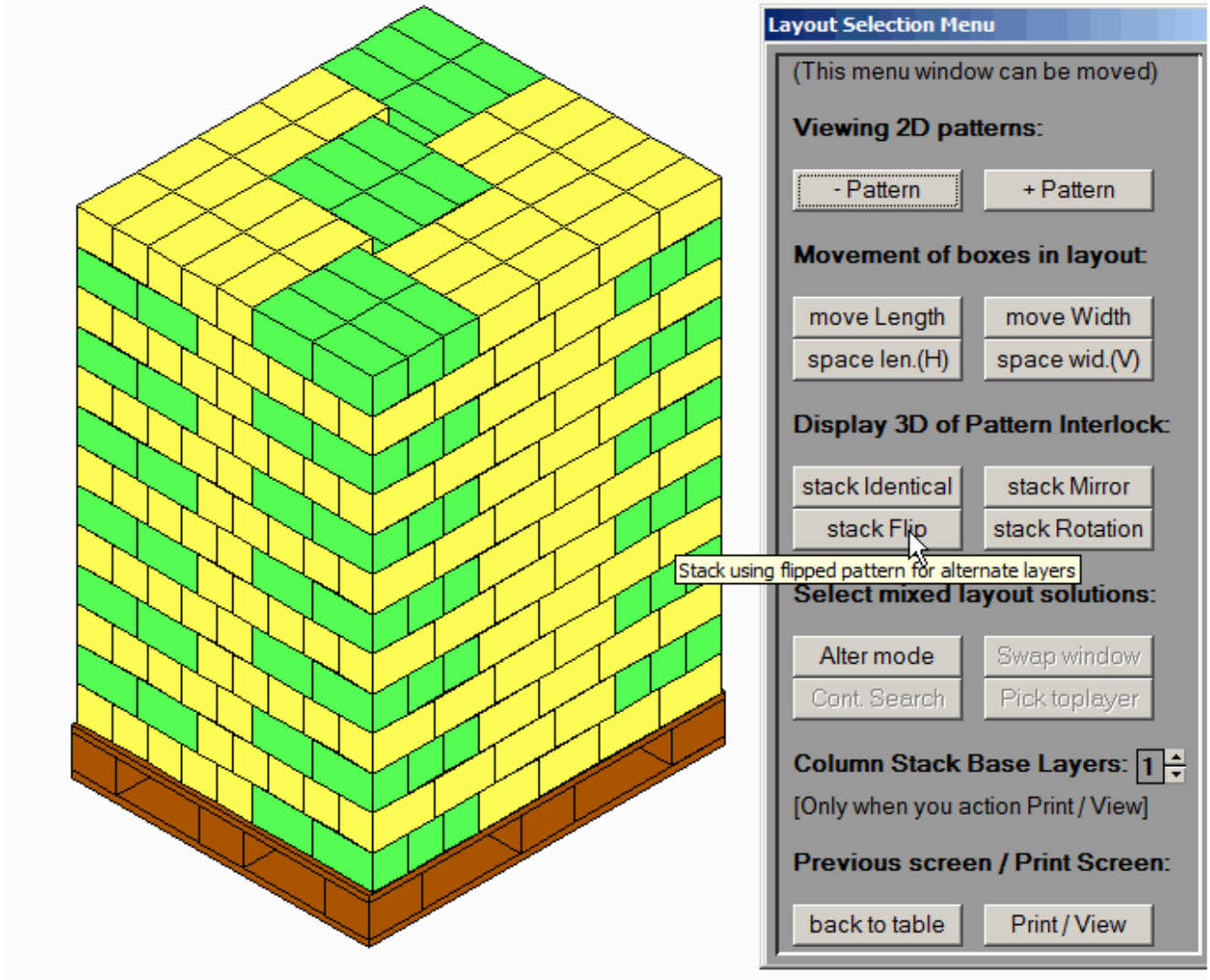
Having identified a suitable layout the Build Stack buttons allow you to build up a 3D stack using, as alternate layers an identical, mirror., flipped or rotated image.

In 'extreme' circumstances it is possible to combine any two totally different layouts to form a stack - something of a last resort usually.

You can also specify that the base of the pallet stack is column stacked, with upper layers forming an interlocked pattern.

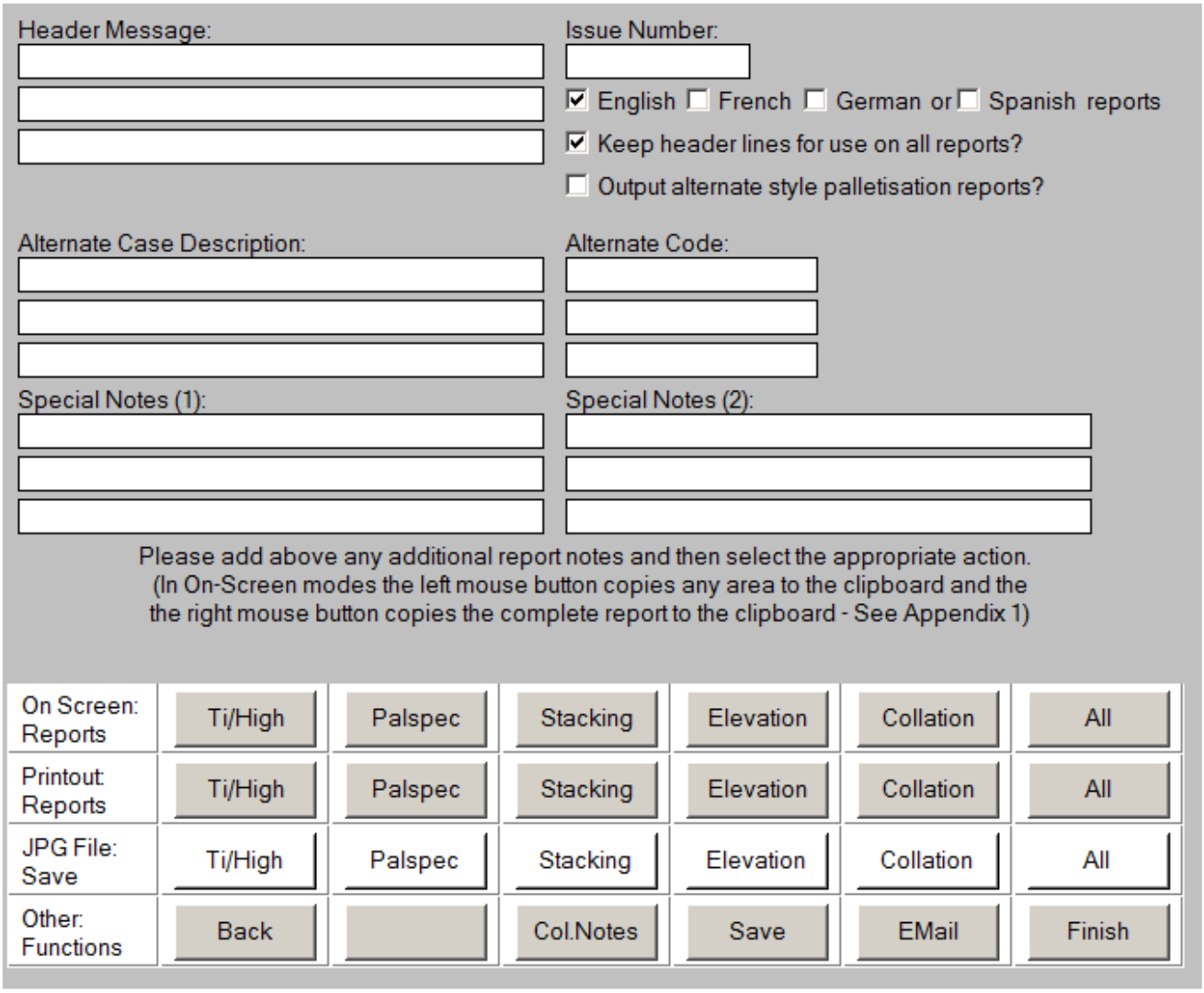
These allow you to either return to the tabular results table or, use the displayed solution and view / print the reports then available.

```
(Use left mouse button to mark an area for Cut & Paste)

Ref. No.                    3    (Length dimension shown across screen)

Layout No.                  1      of       2         (Type          D   )

Ti/High of this stack:   48 per layer stacked   13 layers high

Underhang on Length :                                  30

Underhang on Width  :                                   2
```



The result of selecting **Flip** whilst displaying Layout 1 is shown.

Assuming that this is indeed a suitable stacking pattern selecting **Print / View** will lead to the Notes & Reports screen (Screen 7) from where Printer / Screen reports are selected. This is shown below.



Rep

are already very detailed but you can add addition text using any or all of the entries provided above. In addition you can select an alternate language to be used for output to screen / printer. Five reports are available here and screen and printer output are identical (though on-screen view shows top and bottom halves of the printed page on 2 screens). View on screen and then print as needed. Reports, or parts of reports can be Cut to the Windows clipboard using left and right mouse buttons. Language options in this release are English, French, German and Spanish.

Users having the Webbase module will also find an additional row of (white) buttons available. The Webbase module is fully described in Section 14 of this manual.

The first of the available reports (Ti/High) for Example 2 is shown below:

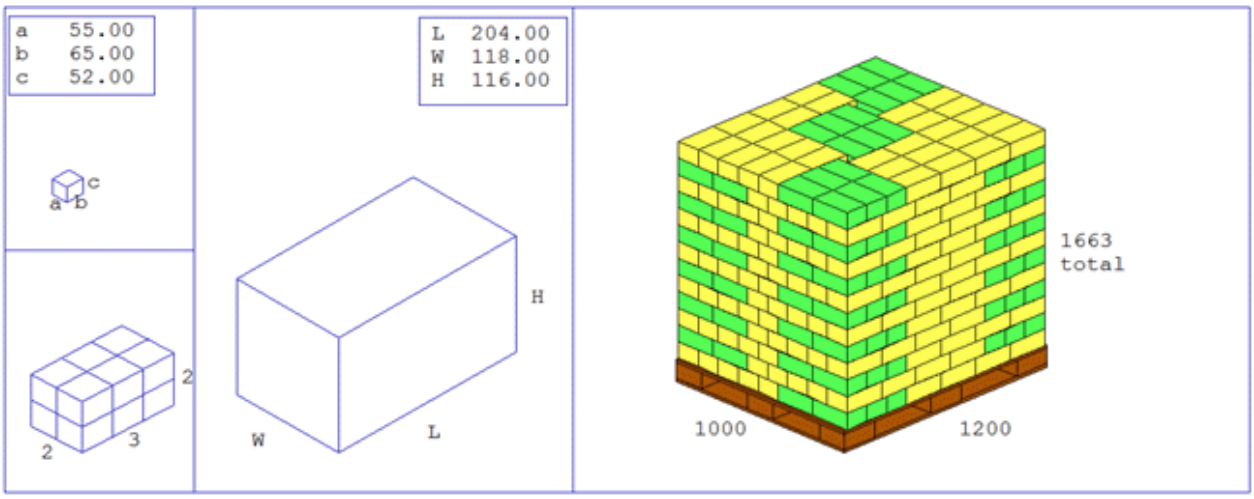
You can now put your logo here!!

PALLETMANAGER Ti/High Report Issue No. 27/01/11
(packyourpallet.com)

Example - section 3 0123456

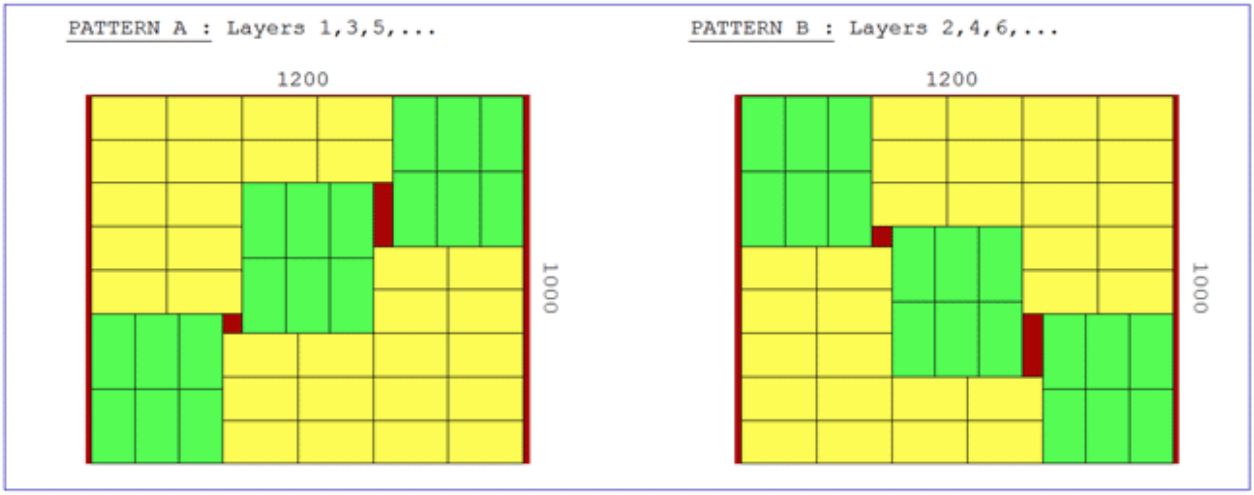
SUMMARY

Ext. Dims.	204.0 x 118.0 x 116.0 (Ht)	Gross Weight (kg)	1.380
Int. Dims.	198.0 x 112.0 x 104.0 (Ht)	Case Volume (cu.m)	0.0028
Ti/High:	48 per layer x 13 layers	No. of Cases per Pallet	624



LOADED DETAILS

Overall Length/Width	1200 x 1000	Overhang of Stack (L/W)	-30 / -2
No. of Cases per Pallet	624	No. of Primaries per Case	12
No. of Primaries per Pallet	7488	Notional Gap between items	0
Product Volume (cu.m.)	1.7424	Volume Utilisation of Stack (%)	89.6
Height excluding pallet	1508	Height including pallet	1663
Weight excluding pallet (kg)	861	Weight including pallet (kg)	896



SPECIAL NOTES:

1)

2)

Licence: G001/01 - GOAL

3.4 Improving Solutions.

The table below provides some suggestions and links for techniques to improve your solutions:

Height and Weight Limits?: On the Tabular Results Screen (Screen 5), examine all entries to see what change to height and/or weight constraints allows an extra layer. If this change is possible go **Back** to adjust constraint and re-solve. Alternatively use the **Advanced** layer functions described in Section 5.
Poor pallet area utilisation?: Could a very small amount of overhang be used? (2mm might be enough). To investigate go **Back** and add (say) 25mm to the (zero) overhang values on Screen 3 and re-solve. Both the overhang and non-overhang solutions will be shown - see Section 5.
Pallet top layer?: Could the top pallet layer consist of the same cases as the rest of the stack but in another orientation? If so select the **Top-Layer** option from Screen 4 as described in Section 11.
Dimension Changes (1)?: Just how close might you be to fitting extra product / layer. PALLETMANAGER gives you the optimal solution for the size you input but small changes to this (0.1mm perhaps) may improve things. The powerful **Do Better module** will help you! Described in Section 15.
Dimension changes (2)?: Is there any scope for *minor* dimensional changes to primary or case dimensions whilst still retaining volume. If so the powerful **Fixed Volume** module can assist you in improving solutions in a manner impossible using trial and error or stepwise examinations. (See Section 7).
Unstable stacks?: Are the optimal pallet patterns produced unable to be stacked in a suitably stable manner? Usually the ability to move and centralise layouts will provide the solution (See Section 5), but in extreme instances you may need to select totally different layouts (of the same case size) to achieve a stable stack (see Section 11).
Too complex?: Perhaps the optimal layouts are too complex and you need something simpler. You can reduce the number / layer to a lower value from the Results Summary screen using the **Advanced** options (See Section 5). This might also be appropriate with a very heavy product where the stack height is limited by weight. Reducing the number/layer by (say) one could allow an extra layer can be fitted.
Cube Packing?: If packing cases on a pallet could a solution be used with (say) all 3 case orientations used to create the stack. In such situations the **Cube** mode of operation is appropriate (see Section 8).
Cylindrical product?: If so have you examined the section relating to all aspects of cylindrical packing (see Section 10).
Saving Solutions?: Do you need to save solutions for future use either locally or on an Intranet. If so the **Store** module provides the solution.
In Collation / Tertiary Modes - as well as the above:
Case Material: Are the amounts allowed for case material sufficient or excessive? The 'stackability' of different case designs can be examined using the **Case Strength** module described in Section 6.
Case Costs: Are the cost entries for case materials appropriate. As illustrated in Example 2 tackled earlier in this section solutions with the highest pallet utilisation are not necessarily the most cost effective.
Case rationalisation: Do you need to consider whether any existing case designs are similar in size to those generated? If so the **case rationalisation** facility can be used (see Section 13).
Nesting: Do the products nest. If so see Section 6.

The Next Stage.

Having examined one or both of the above examples the next stage for new users is to set up default pallet, tray/tote and packing styles. This procedure is covered in Section 4.

Previous Section | Top of Section | Following Section

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Previous Section | Index Page | Following Section

SECTION 4 -

SETTING UP DEFAULT DATA

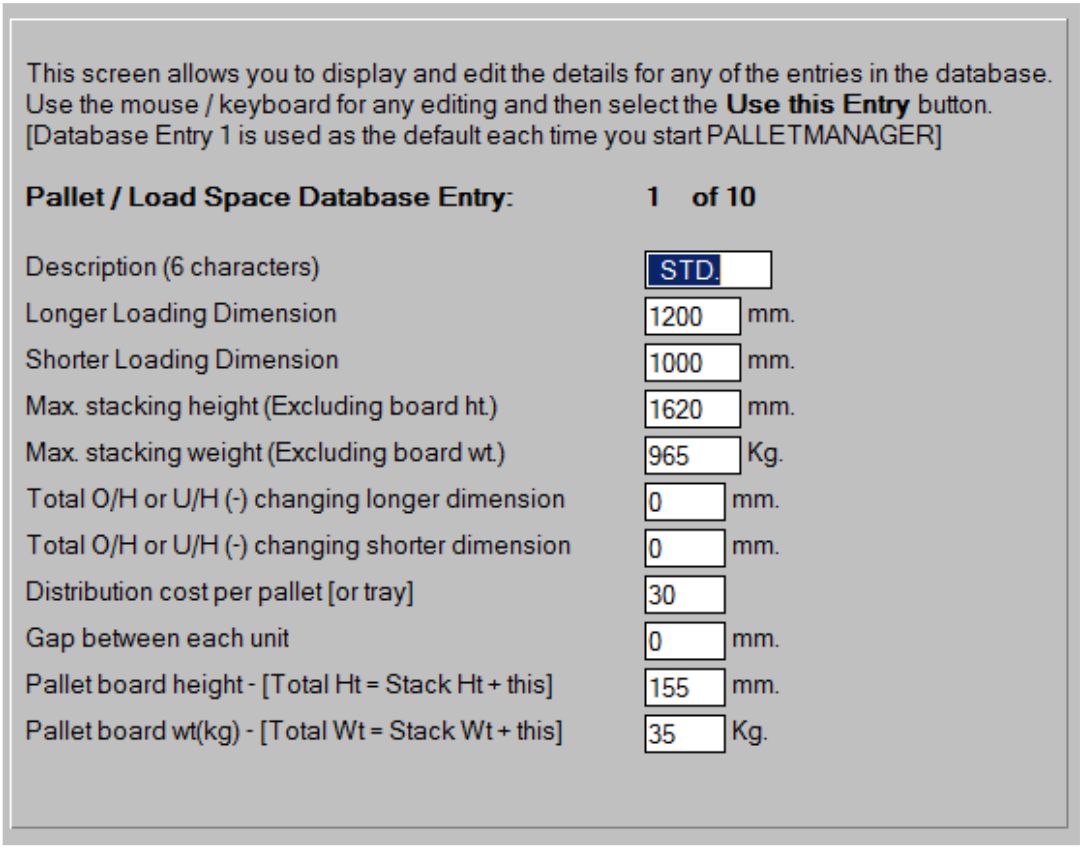
(Covers: Introduction, Setting default load space sizes, Setting default case styles, Case Designs, Tray and Shrink Wrap, Styles 29 and 30)

4.1 Introduction.

On installation PALLETMANAGER uses default values for both the **loading space** available (pallet, tray, tote etc) and for case **Styles**. The sets of values in these databases may be suitable for initial use, but it will generally be necessary for you to modify the supplied values to meet your own situation.Users who have upgraded from earlier versions using the same installation folder will retain their pallet and style defaults. If this release has been installed in a new directory / folder then you will need to copy the appropriate files as detailed in Section 2.

4.2 Setting Default Load Space Values.

Start up PALLETMANAGER and select **New Run** and then **Palletise**. The Case Data Entry Screen (Screen 2) is displayed. Without making any entries select the **Continue** button to display the Pallet & Style Selection screen (Screen 3) and on this screen select the **Pallet Database** button. The screen below will be displayed:



PALLETMANAGER has a database holding details of 10 load space sizes (pallets, trays, totes etc). Database entry 1 is the default and should be configured to match your most common load space. Other database entries should be configures for less commonly encountered sizes. Entry 1 will be the size appearing as the

default load space on Screen 3 (Pallet / Style Selection) whenever PALLETMANAGER is run. The values on Screen 3 can be changed temporarily on that screen for a particular run but changes there will not be stored in the database for subsequent use.

Any of the values on the above screen can be edited using the mouse / tab / enter keys and the Previous Entry and Next Entry buttons allow you to set up a variety of entries to meet your needs. On selecting Use this Entry the values are updated in the database.

The Information Held in the Database.

The information requested is in general self-explanatory, though the notes below may be of assistance:

The ***maximum stacking height and weight*** are those for the load and for pallet loads they **exclude** the height of the pallet itslef. The values can be changed temporarily during a run on Screen 3, and may also be overridden by selecting to *Add a Layer* or *Remove a layer* in the advanced options discussed in Section 5.

Overhang / Underhang values are the maximum values which apply on the appropriate dimensions. Underhang is indicated by typing a minus before the value. The result of these calculations is the load area available. PALLETMANAGER will provide solutions which never exceed the calculated load area. If overhang has been specified then it will be utilised as and when necessary to give a better solution. If overhang / underhang is specified then you solutions both with and without the use of this amount will be claculated and displayed. *Overhang Analysis* is discussed in detail in Section 5 of this manual.

The ***Distribution cost / pallet*** is made up from storage, movement, transport and pallet costs for an average pallet load of your product. PALLETMANAGER will calculate the number of pallet loads per year based on the cases per pallet achieved and your estimated annual case volume. The result will be shown as the total annual distribution cost for a solution. As discussed in Section 16 a value of zero will probably used in tray packing.

The ***Gap between each unit*** value is an allowance for bulging, case dimension discrepancies and so on. It will not be shown graphically on pallet layouts.

The ***pallet board height and weight*** values you give are added to the load height and weight as presented on printed specifications. However they are not used during computation. For tray / tote loading values of zero will normally be used - see Section 16.

4.3 Setting Pack Style Values.

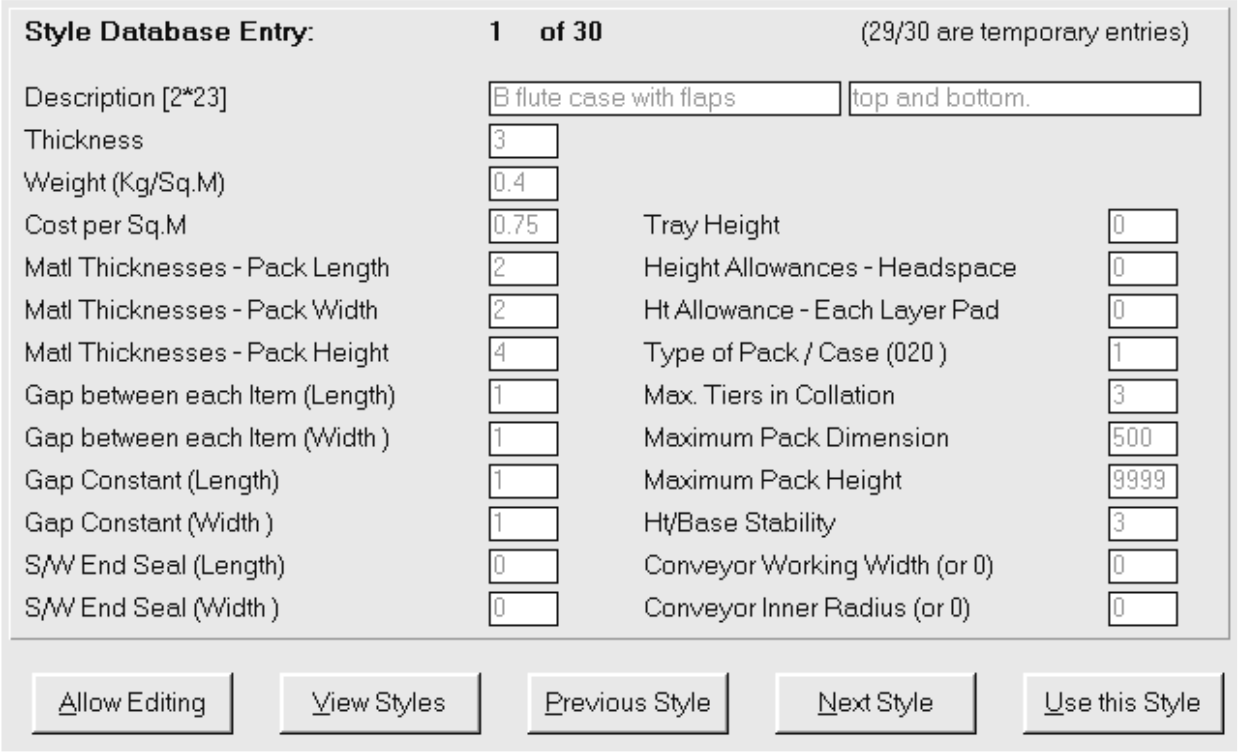
If you have the **Collation** module, PALLETMANAGER can store details of up to twenty eight different packaging styles and you must change the details that have been supplied on your system to comply with your own standards. An additional two Style entries (Styles 29 and 30) provide temporary storage (as described below) and should NOT normally be utilised.The details held by PALLETMANAGER on packaging styles are used to calculate packaging cost, case dimensions and weight.

Start up **PALLETMANAGER** and select **New Run** and then **Collation**.

The Primary Data Entry Screen (Screen 2) is displayed. Without making any entries select the **Continue** button to display the Pallet & Style Selection screen (Screen 3) and on this screen select the **Style Database** button.

Having selected the **Style** option a screen similar to that shown below will be displayed. You will be alerted to the fact that initially the screen is set to 'Read Only' and the Allow Editing button must be pressed before editing is possible. The mouse and arrow keys etc can be used to move around the screen.

If you wish to abandon the changes you have made then you should use the **Quit** button at the top left of the screen. Once the 'Use this Style' button is pressed then any database changes will be updated.



The database values for the selected style are used to:

- to size the case and determine its weight.
- to estimate the cost of material used in a pack

When **Collation** mode is entered **Style 1** will be automatically selected as that to be used and therefore this should be set up to contain details of your most commonly used packaging style.

In TERTIARY mode **Style 28** is used as the default style for the packaging used to create a primary unit. This is described in detail is Section 12.

The Style screen contains the following details:

Description: A user description of the type of packaging.

Material Details:

Thickness: The thickness of a single layer of the packaging material used. Used to calculate the case external dimensions.

Weight: The weight of this material in Kg/Sq.M - used to calculate the weight of packaging material used.

Cost: A cost/ sq. metre figure for packaging material. Although we realise that the cost of a particular pack design is NOT based solely on material usage, this figure helps in providing an indication of comparative costs of alternative packs.

Case Sizing: Each collation of primary units forms a 'block' of given size, to which are to be added allowances for material thicknesses and spaces within the case. These allowances are added to the length, width and height so as to determine the final external case size. The largest base dimension of the basic 'block' (prior to the addition of these allowances) is the one referred to as the length dimension. When nesting cylindrical items other considerations have to be made and these are discussed in Section 10 which deals with all aspects of cylindrical packing.

The entries for *Material Thicknesses* represent the number of thicknesses of packing material (whose thickness was specified above) which need to be allowed for when calculating the external case size. This should allow for flaps, overlaps etc. for cardboard cases and trays.

Gap between each item is a notional gap between each primary unit which can be used to allow for internal dividers (the **area** of these will not be calculated however) or more commonly can be used to ensure that your primary units have sufficient clearance inside the case to facilitate filling or removal.

Different values can be specified for the length and width of the case. This spacing is only applied in the horizontal plane and does NOT apply to cylinder packing (See Section 10).

Gap Constant is similar to the above except that it is not dependent on the number of units in a row. Once again different values can be applied to case length and width and these additions are only applied in the horizontal plane.

On some (Customised) systems the Gap Constant is configured to operate in a slightly different manner. If the Style Database the screen text says 'Gap Constant (larger collation)', then the Gap Constant you enter here will be applied to (added to) the base case dimension that is made up of the greatest number of collated units - equivalently for the 'Gap Constant (smaller collation)'. If the collation in both directions is the same then the 'larger collation' addition figure will be added to case length and the 'smaller collation' figure to case width.

The following 2 parameters only relate to tray and shrink-wrap:

Shrink Wrap End Seal is the total of both end seals if shrink-wrap is in use. Normally only one of the two values (for length or width) would be set non-zero, but if both are set non-zero then both allowances will be applied.

Tray Height is the height to which the tray side extends up the pack. This is ONLY given a non-zero value if a tray design is to be used.

When using a cardboard case the following values may be specified:

Headspace and *Layer Pad* values are the vertical allowances which provide for any headspace which may be required within the case, and for the thickness of **each** layer pad which may be required. It is assumed that the number of layer pads used equals the number of layers in the case minus one.

Case Type denotes the case construction in use. This can take on values from zero to 8. Values from 0 to 4 refer to styles 0200, 0201, 0202, 0203 and 0204 as defined in British Standard 1133. Case types 5 to 8 are included to cater for specific styles in general use but these do not generally have B.S. definitions. The type chosen determines the packing material area and cost calculations which are used but does **NOT** affect the external case dimensions. These are determined from the material thickness values as described above.

If a tray height has been specified then one of the two tray designs will be used. The 'Simple Tray' design will be assumed if style 0 has been selected, otherwise tray style 0422 is assumed. A blank entry may also be made and this will case area calculation being made as for style 0200, but NO reference to style will appear on reports.

Full details of the case constructions and suggested values for material thicknesses are given on the following pages.

Pack Constraints:

A variety of constraints can be set to ensure that cases which are generated by PALLETMANAGER are acceptable for your particular environment. These include:

The *Maximum Number of Tiers* which you are prepared to use in a collation.

The *Maximum Pack Dimension* which you are prepared to have for any case edge. Any collation which would cause this dimension to be exceeded after material and gap allowances have been added will be excluded from the analysis. As would be expected the same applies to the *Maximum Pack Height* constraint.

PALLETMANAGER will save cases that are excluded and you can override these constraints if you wish when you display the excluded case sizes.

The *Height to Base Stability Ratio* - the maximum ratio between height to smallest base dimension which may be used. PALLETMANAGER will exclude any case for which this value is exceeded.

Two other values may be specified. These are the ***working width*** and ***inner radius*** of any ***conveyor*** system in use. PALLETMANAGER will perform calculations to ensure any case generated will pass through such a conveyor system. If they are set equal to **zero** then it is assumed that no conveyor is in use. Once again, if these are given values, cases may be excluded.

To modify any values (after selecting the Allow Editing button), just use the mouse or keyboard keys to move to an entry and update as needed.

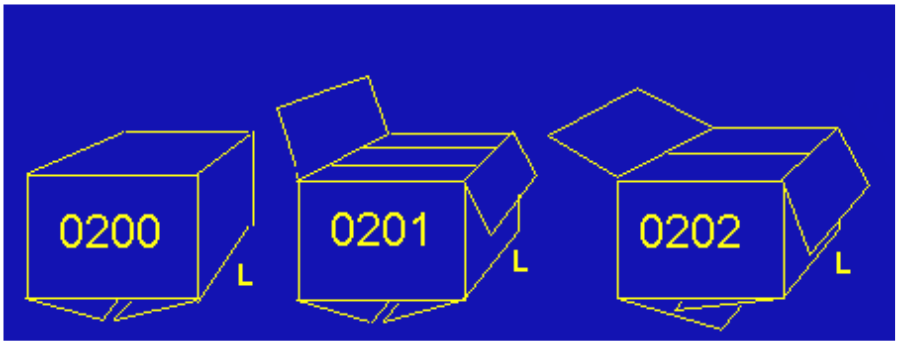
4.4 Case Styles.

PALLETMANAGER provides the facility to specify one of 9 case types (see description of parameters above). This information is used in the calculation of board area and therefore cost and weight. The case type specified is **NOT** used for case dimension calculations as the dimensional values specified earlier are used for this purpose.

It is important to realise that PALLETMANAGER can only provide an indication of relative costs as the economics of case design and manufacture will vary from company to company.

In order for case calculations to be correctly made it is **essential** that the shrink wrap and tray variables are set to zero if a cardboard case is in use. If they are non-zero then tray calculations for cardboard area are used.

It should be noted that the drawings of styles produced below are depicted as they would be loaded onto the pallet. Thus, for example, styles 1 through to 4 all have the joining flap on the case top, whilst styles 7 and 8 have flaps on side. A 'group' picture of the major supported styles can be selected from the Styles screen using the View Styles button.



Case Design 0 : Type 0200.

This design (to BS1133: Section 7) is for an open-top case. The case area is calculated according to the formula given below.

Case Area = [Case Length * 2.0 + Case Width * 2.0]

* [Case Height + 0.5 * Case Width]

The following values for Packaging Details might typically be used with design 0200:

Mat. Thicknesses Length	2	Tray Height	0 - essential
Mat. Thicknesses Width	2	Headspace	0
Mat. Thicknesses Height	2	Type of case	0200
Gaps	User determined		
S/W end seal	0		

Case Design 1 : Type 0201.

This design (to BS1133: Section 7) is for a case in which the longer flaps at top and bottom just meet. The 'minor' flaps may not meet. The case area is calculated according to the formula given below.

Case Area =

[Case Length * 2.0 + Case Width * 2.0]

* [Case Height + Case Width]

The following values for Packaging Details might typically be used with design 0201:

Mat. Thicknesses Length	2	Tray Height	0 - essential
Mat. Thicknesses Width	2	Headspace	0
Mat. Thicknesses Height	4	Type of case	0201
Gaps	User determined		
S/W end seal	0		

The formula is also appropriate for wrap-around designs in which end flaps are at top and bottom:

Case Design 2: Type 0202.

This design (to BS1133: Section 7) is for a case in which the longer flaps at top and bottom overlap but do not extend to the opposite face of the case. The 'minor' flaps may not meet. The case area is calculated according to the following formula:

Case Area =

[Case Length * 2.0 + Case Width * 2.0]

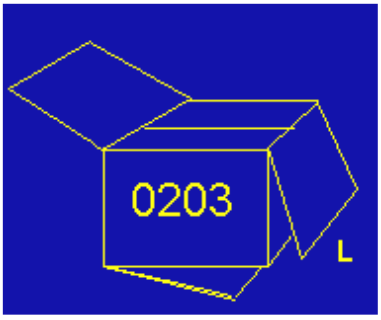
* [Case Height + Case Width * 1.5]

The following values for Packaging Details might typically be used with this design:

Mat. Thicknesses Length	2	Tray Height	0 - essential
Mat. Thicknesses Width	2	Headspace	0
Mat. Thicknesses Height	6	Type of case	0202
Gaps	User determined		
S/W end seal	0		

Case Design 3: Type 0203.

This design (to BS1133: Section 7) is for a case in which the longer flaps at top and bottom overlap and extend to the opposite face of the case. The 'minor' flaps may not, but usually would, meet.



The case area is calculated according to the following formula:

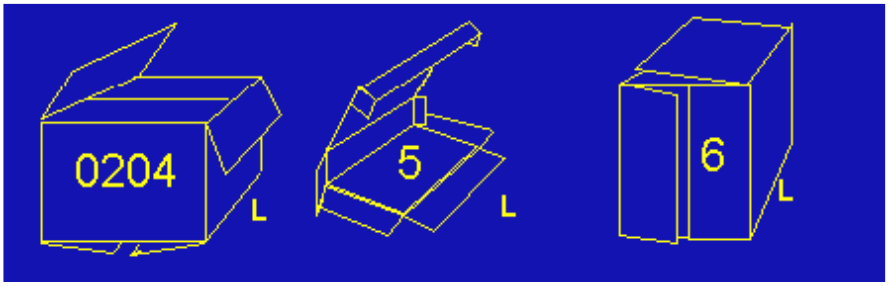
Case Area =

[Case Length * 2.0 + Case Width * 2.0]

* [Case Height + Case Width * 2.0]

The following values for Packaging Details might typically be used with this design:

Mat. Thicknesses Length	2	Tray Height	0 - essential
Mat. Thicknesses Width	2	Headspace	0
Mat. Thicknesses Height	6 or more	Type of case	0203
Gaps	User determined		
S/W end seal	0		



Case Design 4: Type 0204.

This design (to BS1133: Section 7) is for a case in which both the longer and shorter flaps at top and bottom meet. The case area is calculated according to the following formula:

Case Area =

[Case Length * 2.0 + Case Width * 2.0]

* [Case Height + Case Length]

The following values for Packaging Details might typically be used with this design:

Mat. Thicknesses Length	2	Tray Height	0 - essential
Mat. Thicknesses Width	2	Headspace	0
Mat. Thicknesses Height	4	Type of case	0204
Gaps	User determined		
S/W end seal	0		

Case Design 5: Type 5.

This design is NOT to British Standards and is included to cater for a particular style of wrap pack (International Fibreboard case code 0410), such as that illustrated.

The case area is calculated according to the following formula:

Case Area =

[Case Height * 3.0 + Case Width * 2.0]

* [Case Height * 2.0 + Case Length]

The following values for Packaging Details might typically be used with this design:

Mat. Thicknesses Length	6	Tray Height	0 - essential
Mat. Thicknesses Width	2	Headspace	0
Mat. Thicknesses Height	2	Type of case	0205
Gaps	User determined		
S/W end seal	0		

Case Design 6.

This design of case, increasingly used for drinks packaging. The top flaps both extend across the full width of the case, and end flaps just meet.

The case area is calculated according to the following formula:

Case Area =

[Case Height * 2.0 + Case Width * 3.0]

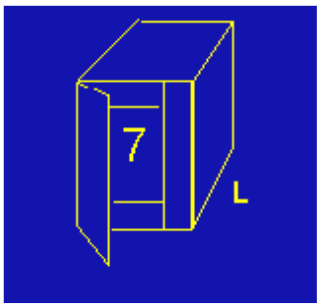
* [Case Width + Case Length]

The following values for Packaging Details might typically be used with this design:

Mat. Thicknesses Length	4	Tray Height	0 - essential
Mat. Thicknesses Width	2	Headspace	0
Mat. Thicknesses Height	3	Type of case	6
Gaps	User determined		
S/W end seal	0		

Case Design 7.

This is a simple wrap-around design. As illustrated the end flaps are such that the product is visible at each end.



The case area is calculated according to the following formula:

Case Area =

[Case Height * 2.0 + Case Width * 2.0]

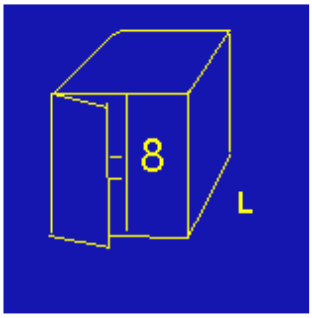
* [Case Width * 0.5 + Case Length]

The following values for Packaging Details might typically be used with this design:

Mat. Thicknesses Length	4	Tray Height	0 - essential
Mat. Thicknesses Width	2	Headspace	0
Mat. Thicknesses Height	2	Type of case	7
Gaps	User determined		
S/W end seal	0		

Case Design 8.

This design is similar to Style 7, except that the side flaps are designed to just meet.



The case area is calculated according to the following formula:

Case Area =

[Case Height * 2.0 + Case Width * 2.0]

* [Case Width + Case Length]

The following values for Packaging Details might typically be used with this design:

Mat. Thicknesses Length	4	Tray Height	0 - essential
Mat. Thicknesses Width	2	Headspace	0
Mat. Thicknesses Height	2	Type of case	8
Gaps	User determined		
S/W end seal	0		

The designs presented above may also be viewed on screen during input / modification of the style details. Pressing **View Styles** will display a full screen of designs.

4.5 Tray Designs and shrink wrap solutions.

PALLETMANAGER caters for two cardboard tray designs, a 'simple' tray construction, and a type 0422 design.

Whenever a NON-ZERO value is given for tray height (on the packaging style screen), tray area calculations will be carried out.

If Case Type 0 (zero) has been selected (which would be otherwise used for an open-top case) then a SIMPLE TRAY will be assumed.

If ANY OTHER Case Type (1 through to 8) is selected, then the type 0422 tray calculations will be used. This tray type utilises rather more card in its construction than the 'simple' tray design.

A 'Simple' Tray

In this design a simple rectangular card blank is folded to create a tray.This design has the following area calculations applied:

'Case' (i.e. Tray) Area =

[case length + (2.0 * tray height)] *

[case width + (2.0 * tray height)]

This formula is applied whenever tray height is set to be greater than zero and case style is set = 0.

Tray Design - Style 0422.

This tray design follows the BS standard and in addition to the basic design includes an additional flap at each end which is folded into the base so as to secure the tray construction.

This design has the following area calculations applied:

'Case' (i.e. Tray) Area =

[case length + (4.0 * tray height)] * [case width + (2.0 * tray height)]

This formula is applied whenever tray height is set greater than zero and case style has any value other than zero.

In practice, in addition to the above tray designs, a variety of display trays are sometimes utilised. These designs may have a tray height which varies according to the tray face. In such instances the specification within the PALLETMANAGER Case Style screen of a tray height which is the average of the maximum and minimum heights utilised will usually yield a realistic area (and thus cost) calculation.

Other Case Styles.

The above case / tray designs, although representing probably the majority of packing situations, are just a few of more than 100 that could be included. The method used in PALLETMANAGER to calculate the external dimensions of a case, based upon added material thicknesses etc., can correctly size the majority of designs, though the packing material area usage will need to be approximated using one of the included designs. We would welcome user feedback on case designs for future releases.

The Use of Shrink Wrap Alone

As described earlier, the calculation of packing material area / cost is based upon the 'Type of Case', but the calculation of external dimensions is based upon material thickness variables alone.

If a collation of primary (or sub-primary) units is to be packed using shrink wrap alone then the material thickness and end seal variables can be used to size the case, whilst the area of shrink wrap and its cost (based upon the cost/ Sq M. figure you give on the Case Style screen) can be approximated using, for example, the 'case area' calculations applicable for case style 0201.

4.6 Styles 29 and 30.

As stated earlier there are 28 style database entries which may be used by users to permanently store style information. In addition two further styles (29 and 30) are used for temporary storage of style information during running.

Thus, when setting up Style data users will find that up to 28 different descriptions may be defined and permanently retained in a database. Styles 29 and 30 should NOT normally be utilised as they provide only TEMPORARY storage as described below.

During a PALLETMANAGER run there will occasionally be instances when a user may wish to modify a particular style on a temporary basis (e.g. for a single run), so as to identify the effect of a minor dimensional change.

Users of PALLETMANAGER have commented that they sometimes forget to return the changed entry to its original value after the exercise. To avoid this problem, whenever a change is made to any of the Style entries (e.g. Style 5), the user is asked whether the change is to be permanent. If the response is in the affirmative then the Style is 'permanently' changed. If however the change is to be temporary the values held in the Style information (e.g. Style 5) will remain UNCHANGED and the set of temporary values will be copied into Style 29 (in Collation Mode), or Style 30 (Tertiary level) and the appropriate Style (29 or 30) set as the selected style.

The characteristics of the temporary Styles (29 and 30) will remain in force until a new style selection is made, or you return to the main PALLETMANAGER Access Menu.

In **re-run mode** details of a previously tackled problem are retrieved from the STORE database and dimensional, pallet and style information are automatically entered into the appropriate data entry screens.

Style records 29 and 30 are used to hold retrieved style information and these details may additionally be viewed and edited as part of the re-run process.

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SECTION 5 -

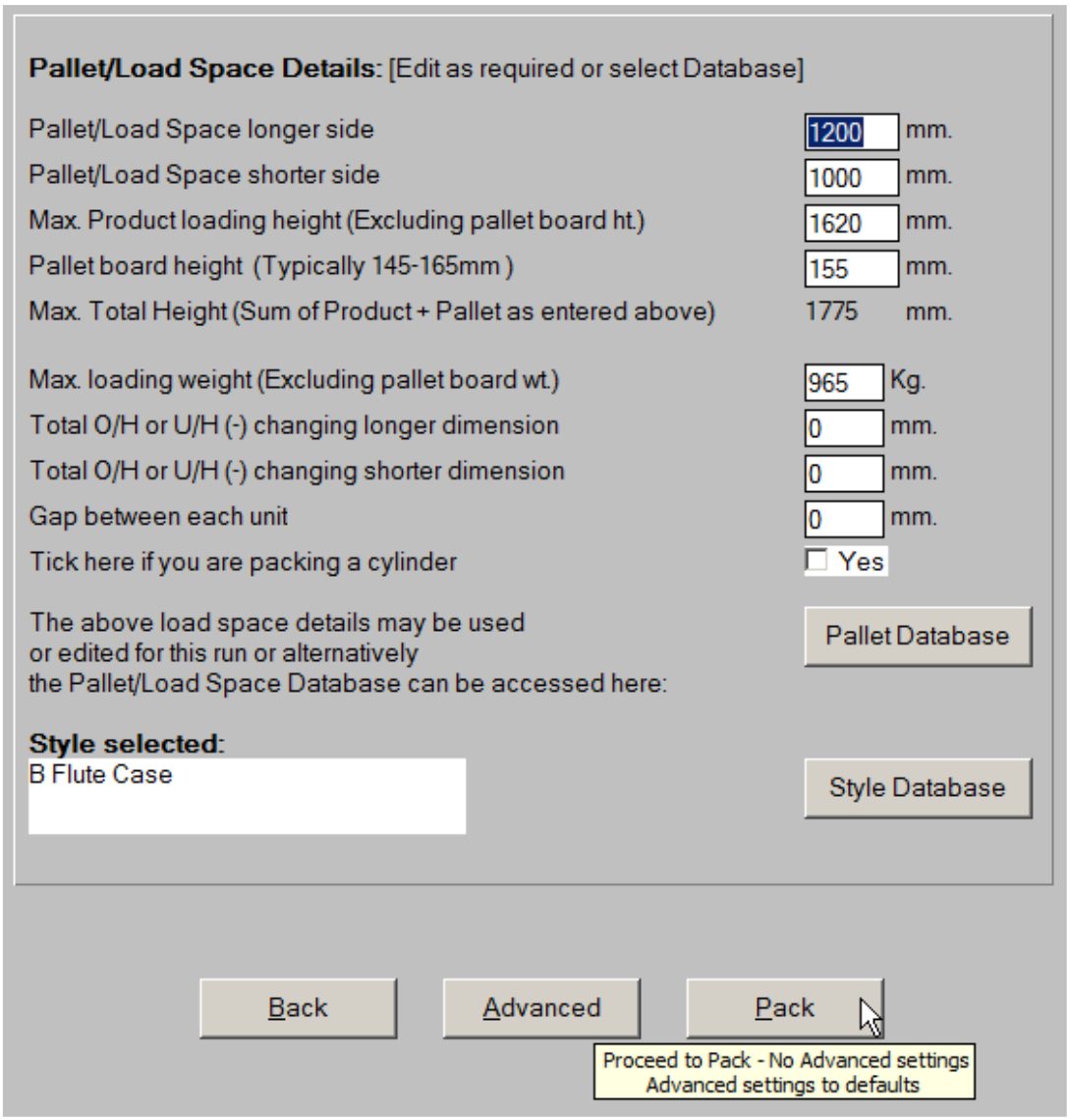
Improving Solutions - Some more advanced features.

(Covers: Introduction, Advanced options on data entry, Advanced option on results display, Reducing number of cases/layer, Displaying layouts, Layout types, Manipulating layouts, Column & Brick Stacks, Elevations report, Using overhang, Comparing Pallet Sizes, Container Fill, Other improvement techniques)

This section of the manual discusses some of the more advanced features of PALLETMANAGER which are applicable to Palletise, Collation and Tertiary Modes and which will assist you in gaining best advantage from the software.

5.1 Introduction.

In both of the previous two sections reference was made to Screen 3 - Pallet and Style Selection. This screen is shown below. (The Style Database button is only shown in Collation and Tertiary Modes).

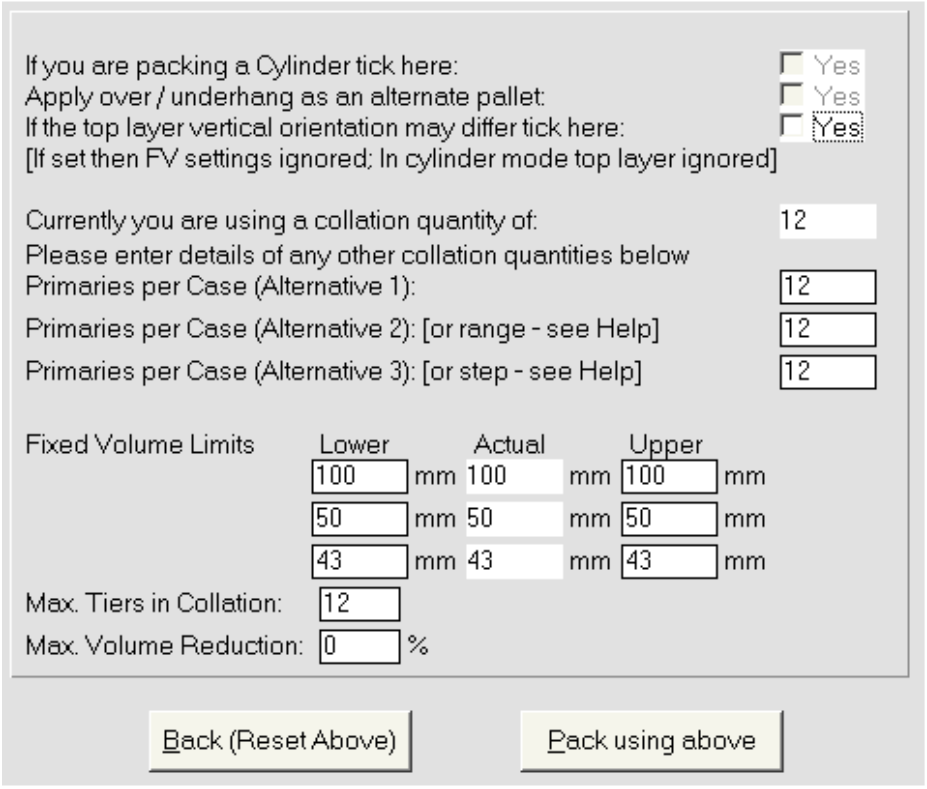


Previous discussion covered all of the buttons on this screen with the exception of the **Advanced** options

selection. In all the PALLETMANAGER runs described so far, having defined the Pallet and Style to be used, the Pack option was selected. When selecting Pack on this screen all the Advanced options about to be discussed below are automatically turned **off**, regardless of whether they had been in use on a previous run.

5.2 Advanced data entry screen.

Selecting **Advanced** options results in the display of the Advanced Options screen (Screen 4):



As discussed below the entries appearing on this screen will depend on the operating mode (Palletise, Collation etc), and on the dimensional information you previously entered for the Case or Primary. Each (possible) entry is described in turn below:

Cylindrical tick box: In both Palletise and Collation mode you may have entered dimensions for Case / Unit / Primary length, width and height, two or more of which are equal. This *might* have been because you were specifying a cylindrical item. On this screen, **if** two or more of the dimensions were equal then they can if appropriate mark the **Cylindrical tick box** thus:  . If dimensions were not equal then the tick box will be greyed. As can be seen from the first page of this section the option of selecting a cylinder can also be made using the selection box on the Pallet / Load Space details screen.

Are you palletising bucket / flowerpot shapes?: In Palletise mode this may be selected to produce palletisations in which the tapering cylindrical shapes (buckets) are alternated - upright and then inverted - so as to potentially pack more on a pallet. This option will only be available if (a) all 3 of the input product dimensions are different - these giving details of the larger diameter of the 'bucket', the smaller diameter of the 'bucket' and the height of the 'bucket' and (b) the height value has been ticked as being the height. (Please also see Section 10 for a more detailed discussion).

Alternative Pallet: If you have (say) to examine the loading of the given cargo onto both 1200*1000 and 1200*800 pallets at the same time then you can specify (on the Pallet Specification Screen) the 1200*1000 as the standard pallet size, and an underhang of -200 against the shorter pallet size. Then, by selecting this box the two pallet sizes will be compared in the results table. Further details are available here.

Top Layer tick box: This allows you to (potentially) make greater use of the available loading height. Normally the stacks you will construct in Palletise, Collation and Tertiary modes will use layers in which the

height of **every** layer is the same. This can lead to situations where there is a significant amount of unused load height. If you are prepared to accept solutions in which the top layer (only) of the load **may** consist of cases on their side then this tick box should be checked.

Alternate Collation Qtys: During data entry in Collation mode you will have specified a Collation quantity, in this instance equal to 12. PALLETMANAGER can investigate a number of specific collation quantities, or indeed a range of values in a single run and allow a direct comparison of solutions.

You can enter up to 3 distinct alternate collation quantities, or, alternatively, a range of quantities between a lower and a higher value. If you wish to enter a range (e.g. 4 to 12) then enter the lower limit as Alternative 1 and enter -12 as Collation Alternative 2. (Notice the negative sign).

These values are considered at the same time as the 'expected collation quantity', and the results for all collation quantities are tabulated together. In doing so the figures entered earlier for Primaries / Case and Case Volume are used to determine the 'Annual Production of Primary units', and cost calculations for all collation quantities are based upon this common basis.

It is also possible to specify an enhanced range: Say you require a collation quantity between 10 and 24 which must be even (i.e. in steps of 2 from the lower limit). You can specify lower and upper limits as above (i.e. 10 and -24), and then set the Alternative 3 value = to the step (here = 2).

The remainder of entries on this screen relate to the ***Fixed Volume*** module in which case or primary dimensions are allowed to varied slightly in an effort to further improve palletisation solutions. This powerful module (and the input of data into the above screen for Fixed Volume) is discussed in Section 7 of the manual.

5.3 Advanced Options During Results Display.

Having input data and selected from either Screen 3 or from Screen 4 to perform the packing phases, after a short delay the Results Summary screen (Screen 5) provides you with a tabular set of results ranked according to cost. This was illustrated and discussed in Section 3 and is shown below:

Load Space available: 1200 * 1000 * 1620 ht.
Buttons such as Layout will calculate and display results for the highlighed entry.
Please highlight any line of the result you are interested in and then select the appropriate button.

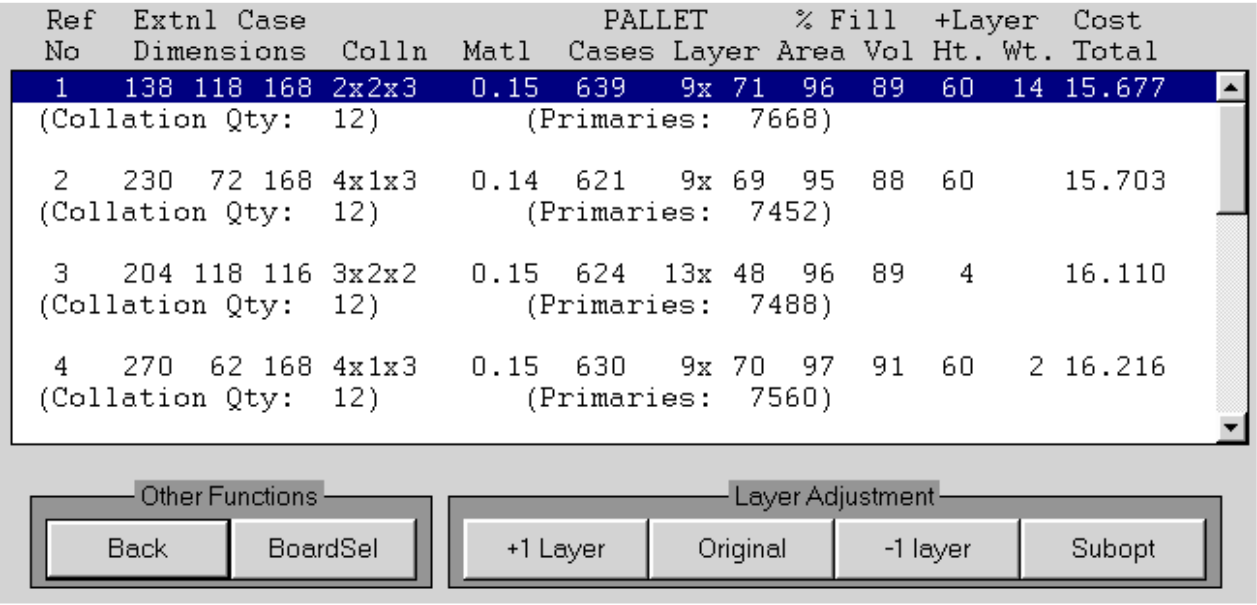
Ref No	Extnl Case Dimensions	Colln	CASE Matl	CASE Wt.	TOTAL Cases	TOTAL Layer	% Fill Area	% Fill Vol	+Layer Ht.	+Layer Wt.	Cost Total
1	138 118 168	2x2x3	.15	1.4	639	9x 71	96	89	60	14	15.677
(Colln. Qty: 12; Pri/Pallet: 7668)											
2	230 72 168	4x1x3	.14	1.4	621	9x 69	95	88	60		15.703
(Colln. Qty: 12; Pri/Pallet: 7452)											
3	204 118 116	3x2x2	.15	1.4	624	13x 48	96	89	4		16.110
(Colln. Qty: 12; Pri/Pallet: 7488)											
4	270 62 168	4x1x3	.15	1.4	630	9x 70	97	91	60	2	16.216
(Colln. Qty: 12; Pri/Pallet: 7560)											

The screen above shows the 'best' four solutions - the scroll bar or keyboard keys allow other entries to be displayed. As discussed during the Guided Tour (Section 3), the Height and Weight columns towards the right of the display indicate the amount of extra height and/or weight needed to allow an extra layer to be fitted. For the 3rd entry just 4mm extra will allow a further pallet layer to be accommodated.

Previously, in order to see what effect a 4mm increase would make we used the Back button to return to the data entry screens, manually changed the height restriction and re-packing.

The **Advanced** options button on the above screen provides you with a variety of options to quickly change the pallet height and weight limits.

Selecting **Advanced** leads to the following screen (Screen 5a):



Here the details regarding each of the cases is unchanged but a new set of buttons are now displayed. Most of these relate to the adjustment of the pallet height / weight limits to accommodate extra (or less) layers.

Examining the ***Layer Adjustment*** buttons:

Prior to selecting these buttons a particular entry in the results table should be highlighted. In this example we might well wish to see the effect of adding a layer to solution reference 3. We would therefore highlight reference 3 and select **+1 Layer**. The pallet height and/or weight limits will be adjusted - here 4mm will be added to the height limit - and the results for all the entries re-calculated and displayed once again in ranked order.

To return to the original height / weight limits then with any of the results highlighted on the Advanced screen **Original** would be selected. The same approach can be adopted with the **-1 layer** button (highlighting a specific entry and selecting the button). Either +/- layer options can be selected repeatedly.

The final button in this set **Subopt** can be used to produce solutions with less cases / layer than the PALLETMANAGER optimal solution. This can very occasionally be useful if the optimal layout(s) calculated by PALLETMANAGER are too complex for practical use or cannot be stacked safely. Given the wide range of optimal layouts considered and presented by the software this is unlikely to be needed. When selected the currently highlighted entry has the quantity / pallet layer reduced by one. It can also selected multiple times, and on each occasion the number/layer will be reduced by a further one case, so that it is possible to begin with a solution providing (say) 40 cases/layer and reduce this to 39, 38, 37 etc progressively.

One problem with the above procedure is that the algorithms within PALLETMANAGER are designed to product OPTIMAL layouts. Whilst it is possible to reduce the number / layer in the above tabular display to whatever numerical value you wish, it may not be possible for PALLETMANAGER to produce a graphical arrangement which produces such a 'bad' solution. In such cases the message: PALLETMANAGER is unable to produce a graphical solution for this problem' will be displayed when attempting to move forwards to display the available layouts. In such instances and alternate approach may be taken to produce the required layout specification and this is described below.

We occasionally receive support calls from users **who needs to re-produce an existing (non-optimal)**

layout and find the above procedure fails to achieve the required solution. When dealing with a significant reduction in number / layer, or when packing a square / nearly square case this may well occur. In such instances the user may well know the 2D plan of the layout.

To produce the required layout with PALLETMANAGER the following procedure can be adopted.

Viewing the 2D plan of the desired plan, examine the pallet length and determine the **total** amount by which the cases fail to make use of the length dimension (**underhang)**. In a similar manner determine the **total** amount unused on the pallet width. Exact values are not essential. If we assume that there is at least 80mm spare on pallet length and 50mm on pallet width, then return to the screen where you specified PALLET DETAILS and change the entry for 'Total OH or UH (-) changing longer dimension (i.e. pallet length)' from zero to -80 (note the minus). Likewise change the corresponding shorter dimension value to -50. Then carry out the packing once again. This should produce for you the number / layout you were seeking to achieve as PALLETMANAGER will now assuming that slightly less space is available on the pallet for the layout. Make any further changes to the underhang as required.

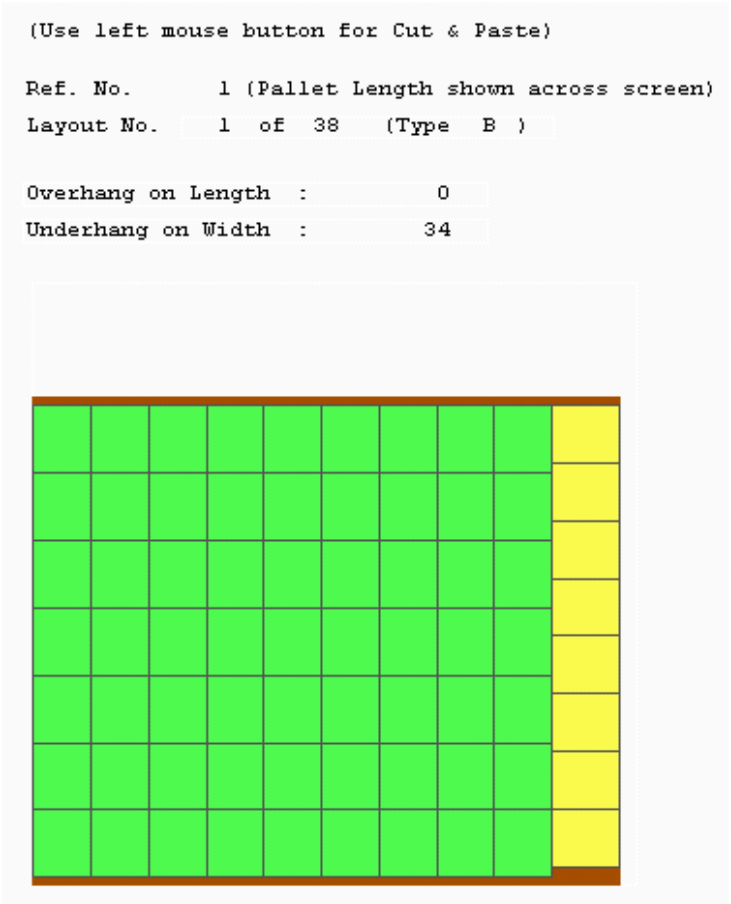
Other Functions

The remaining two buttons are **Back** and **Boardsel**. The former of these buttons returns to the 'standard' tabular results screen (Screen 5), whilst the Boardsel option is designed to assist you in selecting suitable case material for a given application.

Boardsel is discussed in detail in Section 6.

5.4 Displaying Pallet Layouts.

After highlighting (using the mouse) on the Results Summary screen (Screen 5) your preferred solution selecting **Layout** will result in the calculation of **optimal** pallet layouts for your chosen case. You are then presented with a two-dimensional view of the first of the available layouts on Screen 6:



Depending on the characteristics of the problem there may be dozens of possible pallet layouts for the selected case, **each of which accommodates the same optimal number of cases.**

You can browse through the available patterns using the + Pattern and -Pattern buttons. You can construct 3-dimensional pallet stacks in 4 ways:

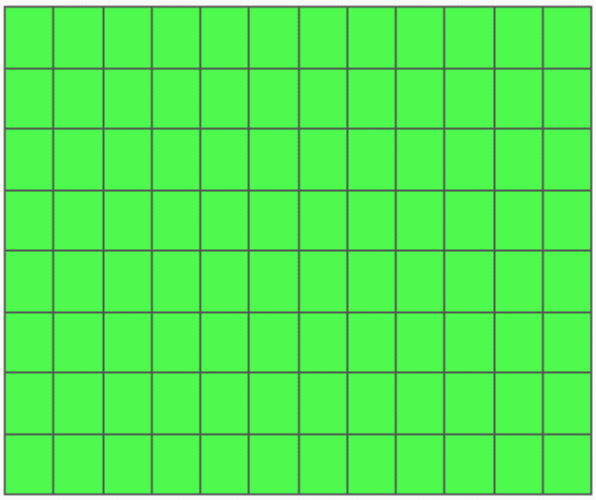
- Use the same pattern on all layers as a column stack.
- Use the same pattern on all layers, but with alternate layers being a rotation, reflection etc of the base layer.
- Use a number of column stacked layers to form the base of the stack and then create the remaining layers as rotation / reflection etc of the base layer - ***(Recently introduced)***.
- or Use two different layouts for odd and even layers. Both layouts (chosen from the set available) will naturally accommodate the same umber of cases / layer.

The procedure for selecting (and manipulating) layouts will be examined a little later in this Section.

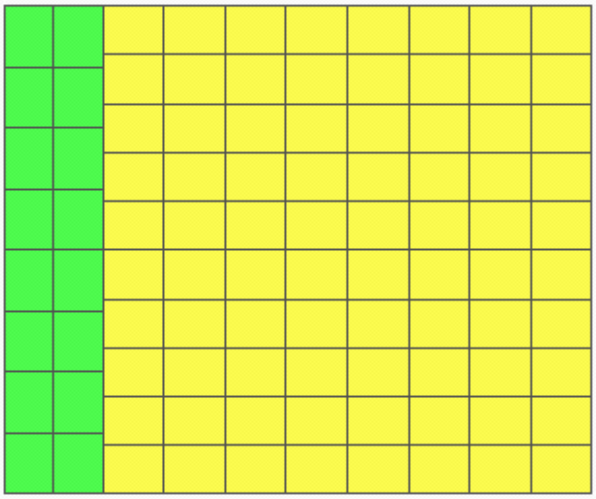
5.5 Pattern Layout Types.

In generating optimal pallet patterns PALLETMANAGER groups the patterns produced according to their characteristics. We code these as Types A through to F. These are shown on the following page:

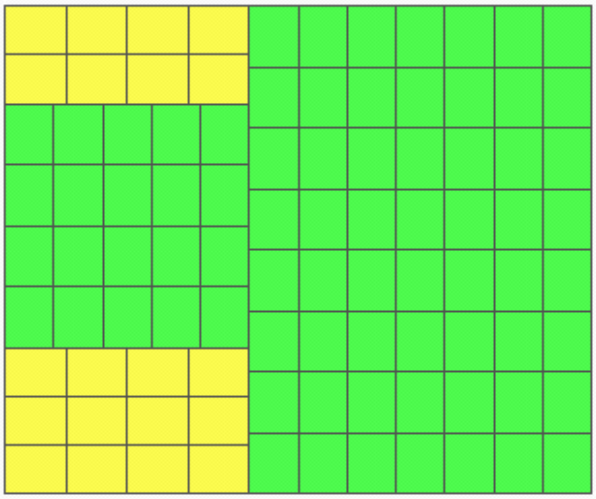
Type A: Simple layouts with all cases in one orientation forming a simple block.



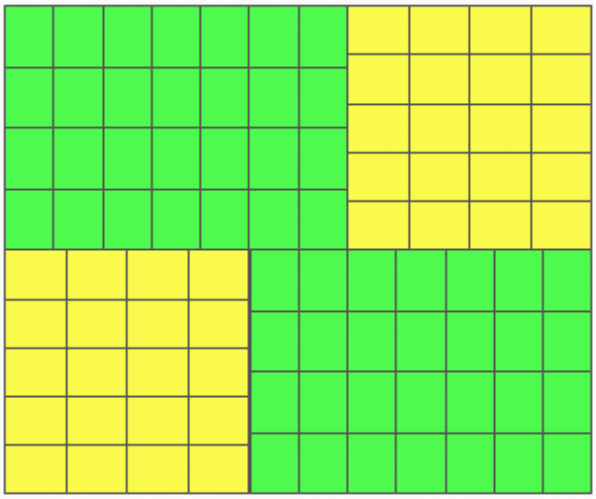
Type B: Layouts having two, three or four distinct groupings on the pallet.



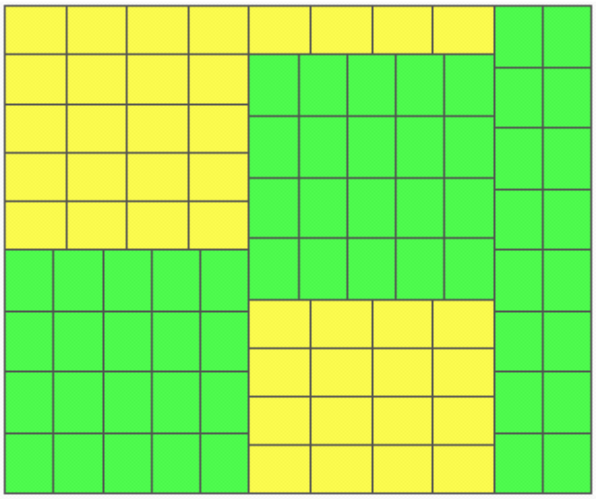
Type C: Symmetric and Asymmetric 'T' layouts.



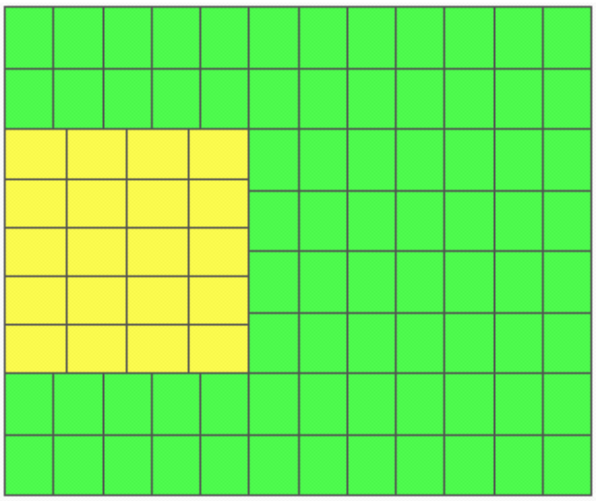
Type D: Spiral and 'staircase' layouts.



Type E: Non-spiral complex layouts.



Type F: Horseshoe layouts.



It should at this point be emphasised that for a given problem not all of these layout types may exist. In fact it might be that only one layout provides an optimal packing. However, in many instances layouts representing several, if not all, of these types may exist and will be available for display.

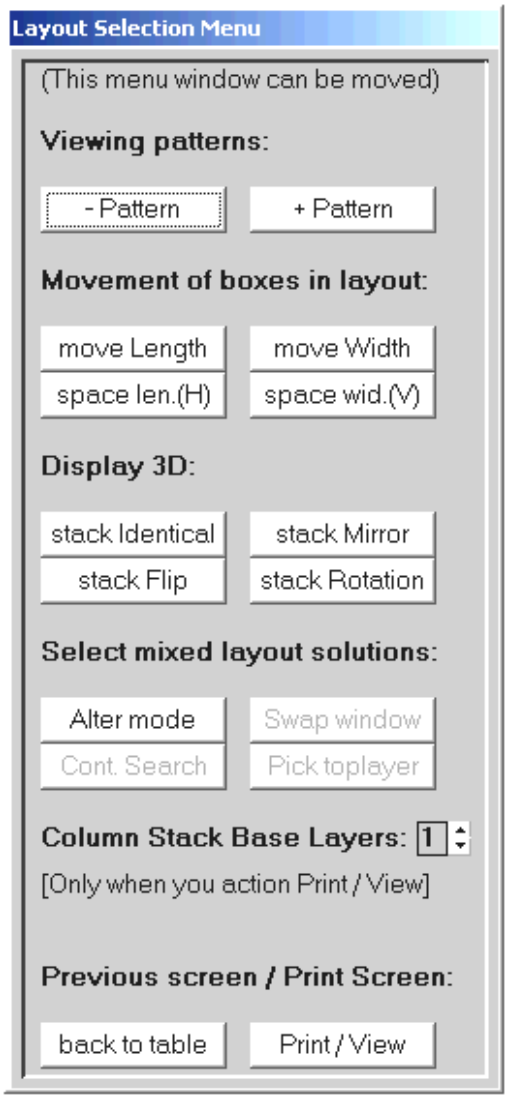
The Type of Layouts contained within each of the six categories are briefly described above. However, given the variations which can occur within even a single type, probably the best way of appreciating the various forms is by examining the notation (A to F) displayed on the Layout Screen as each layout is displayed.

Whilst the + Pattern / - Pattern buttons can be used to browse through the layouts available the keyboard keys **Home** and **End** can also be used to jump between patterns of each type.

5.6 Selecting / Manipulating Patterns.

The menu shown below is used to build up the 3D stack.

Typically, whilst displaying a 2D layout which seems suitable one of the 4 buttons to **Build up Pallet Stack** will be selected. If however the 2D layout is such that some movement of some of the cases prior to building the stack seems necessary then the **Movement** buttons can be used to centralise or space the 2D layout.



The topmost buttons allow you to browse through the various layouts available for the highlighted table entry.

Sometimes the boxes in the layout need centralising on length or width or spacing out along that dimension. These buttons perform such actions.

Having identified a suitable layout the Build Stack buttons allow you to build up a 3D stack using, as alternate layers an identical, mirror., flipped or rotated image.

In 'extreme' circumstances it is possible to combine any two totally different layouts to form a stack - something of a last resort usually.

You can also specify that the base of the pallet stack is column stacked, with upper layers forming an interlocked pattern.

These allow you to either return to the tabular results table or, use the displayed solution and view / print the reports then available.

The move Length and move Width options allow you to move blocks of boxes towards the pallet edge in the direction of pallet **L**ength or **W**idth so as to form a neat packing edge. This option will also centralise a block of boxes on a pallet edge where that block forms the complete edge. You are also able to move the boxes on the pallet using the Spacing options Space len. and Space wid. Normally **L**ength and **W**idth will only have effect if applied **before** the application spacing options. The movement is applied to 'blocks' of boxes, though not to interlocking units. The effect of movements applied can be removed by re-selecting the appropriate layout number.

Having selected an displayed a suitable 3D stack then **Print / View** is selected.

The **AlterMode** button is used when you wish to mix two different pallet layouts to form a stack. This is not usually desirable in practice.

Earlier in this Section the input option to utilise a single top layer of cases in another orientation. When this is selected, and assuming a solution is highlighted which uses a single top layer, then after building up the base stack layers on the above screen the **Pick toplayer** option will be selected prior to selecting Print / View.

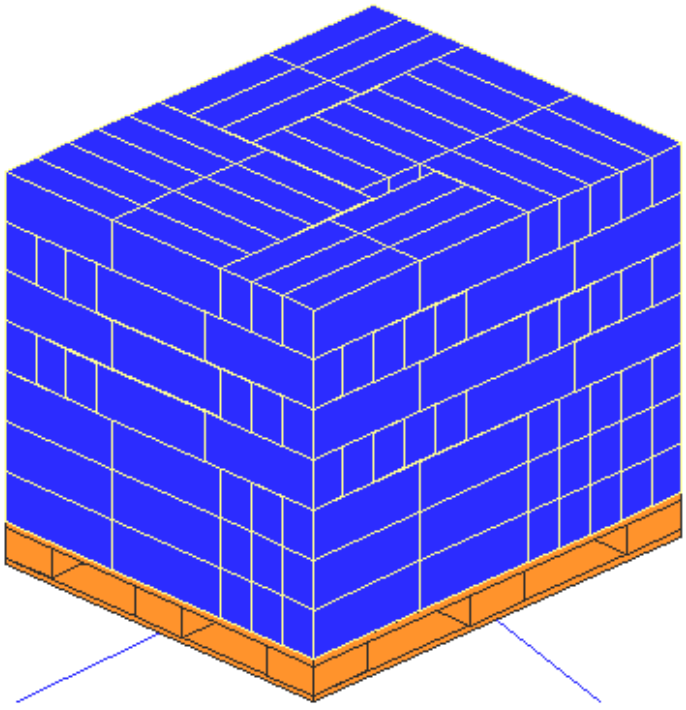
(Past users of the software should be aware that the keyboard keys - capitalised on the above menu, can also be used to control this screen. One feature not supported via the Windows buttons is that of examining 2D stack interlock. Whilst keyboard keys M, F, I, R produce Mirror, Flip etc arrangements in 3D, lower case keys will produce 2D interlock pictures on screen - as with previous releases.)

The use of the three dimensional screen view of the stack, (which can be viewed from both sides by repeated application of the I, M, F and R options) will assist in examining the degree of interlock, as will the use of the Elevation Reports discussed below.

5.7 Creating stacks combining both 'Column' and 'Brick' Stacking.

Whilst the options Mirror, Flip and Rotate on the Layout Selection Menu normally allow you to create pallet stacks which are far more stable than using identical (column stacked) layers throughout the pallet stack, they may not provide the strongest arrangement from the point of minimising product damage.

For some products it may be preferable to form a column stack of cases for the **first few pallet layers** (concentrating the product load onto the well-aligned case edges, each positioned exactly above those in the layer below), **and then use alternating layouts for the top few pallet layers** to produce the degree of interlock required for the complete pallet stack. The extent to which such solutions might provide beneficial will vary from product to product, and will also depend on the case material and the equipment available to align layer on layer.



PALLETMANAGER is able to produce such solutions. The layout selection tools described above allow you to define which layout to use, and how (for the interlocking layers) the 3D stack will be formed. If no

other action is taken by the user then ALL layers in the pallet stack will be structured in this way.

You will note that on the **Layout Selection** menu there is an entry entitled '**Column Stack Base Layers**' which by default has a value = 1. When producing layouts (using Mirror, Flip or Rotate) which do **NOT** have a column stack forming their base then this value indicates that there is as standard just the 1 base layer, with the 2nd layer being of a Mirror / Flip or Rotated form.

If, after creating the type of 3D stack that you require (using M/F/R) you change this value to **(say) 3**, and then **when you select Print / View**, the stack that will be produced on screen / printer will be one with three identical column-stacked layers forming the base layers on the pallet, with those layers above providing the interlocking form as constructed by you on Screen 6.

The printed / on-screen reports are designed to clearly show the form of the pallet stack, and these same reports can be saved to either or both of the Webbase or STORE databases.

You should note the following points:

- The column stacking is only shown diagrammatically once Print / View is selected.
- The maximum value selected for number of column stacked layers is limited to the total number of layers in the stack minus 1.
- A value of 1 indicates the default action of 1 base layer followed by a mirror / flip / rotated image.
- A mirror / flip / rotated pattern must have been selected for alternate layers (otherwise the value for column stacked layers will be ignored as you will be producing a complete column stack anyway).
- The Column Stack Layers value will not be actioned in instances where Alternate Mode layouts (totally different layouts for alternate layers) is selected.

5.8 The Elevations Report.

This report provides further information on the degree of interlock in a stack by providing face-on views of each side of the stack.

This report is obtained from the same menus used to view / print Palletisation and Stacking Reports.

This report is best examined in conjunction with the relevant three-dimensional stacking report. The graphical views of the stack show the position of each case which would be visible to a human viewer standing at the side of the loaded pallet. Some of these cases may be on the periphery of the stack adjacent to the viewer. However, when there are gaps in the stack, other cases may be positioned well behind the face adjacent to the viewer. In examining the degree of interlock it is clearly important to identify such 'holes'. This is done on the Elevations Report by suitable shading.

Three types of shading are utilised:

- Cases on the periphery of the stack adjacent to the viewer are left unshaded. (Coloured dark blue on screen)
- Cases not on the periphery, yet lying less than one case width behind the face are cross shaded. (light blue on screen)
- Cases lying further than one case width behind the front face are shaded in black. (on both screen and printer)

The reader is encouraged to examine the above description in conjunction with their own Stacking and

Elevation Reports.

5.9 Overhang

It should perhaps be mentioned here that even when the product size (e.g. a Case) is fixed then a palletisation improvement may be possible by simply allowing a few mm. pallet overhang (just 1mm might be enough!). This can be a very easy and powerful technique where this does not present problems from product stability / crushability viewpoints.

The potential improvement can easily be examined in any normal Palletise or Collation run. If you enter a pallet base size and then allow a small amount of overhang in the two overhang / underhang selection boxes on Screen 3 (where Pallet Size is selected), then the PALLETMANAGER run will solve **both** the problem using the allowed overhang and that using the base pallet size. **Both** results will be listed on screen with those results lines relating to the base pallet size being flagged with a < character to the right hand size of the results line. (Results using stated overhang / underhang will therefore NOT be marked).

The load space dimensions associated with both the base pallet size and the size of the load area including overhang / underhang are displayed at the top of the results screen.

The screen shows (as usual) values for % Fill on both area and volume. Where no overhang / underhang has been specified then naturally these values represent the percentage of the pallet base and the percentage of the pallet cubic space which is occupied by the product.

When an amount of overhang or underhang have been specified then **all** the utilisation figures are presented on a common basis - by comparison with the load space including any overhang or underhang.

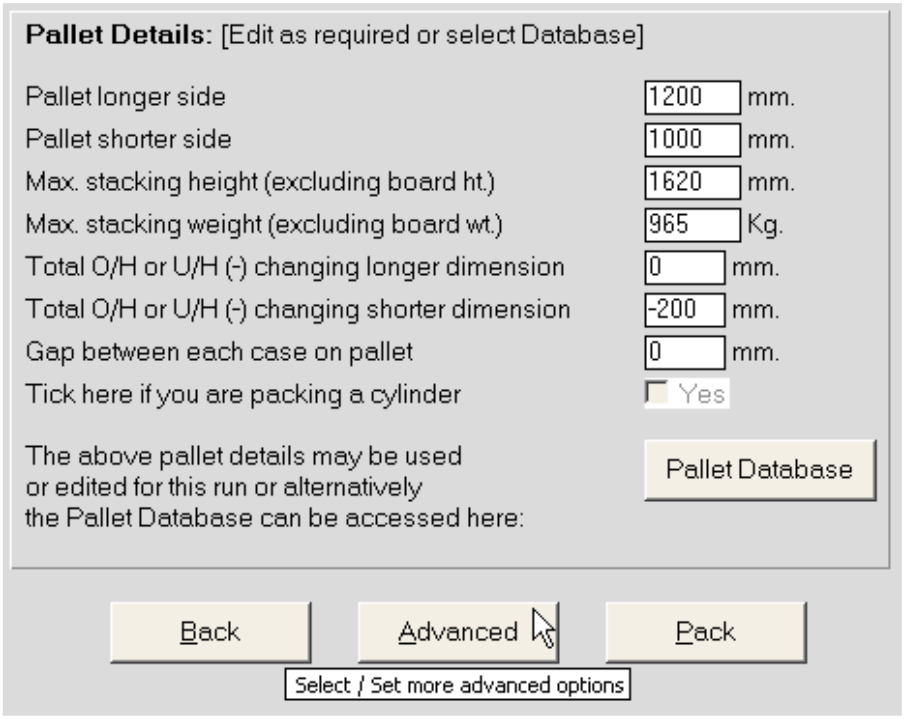
For example, if you tackle a problem on a 1200 * 1000 pallet allowing 50mm overhang on each pallet dimension the area utilisation and volume utilisation figures for **all** result lines will be based on a 1250 * 1050 * 1620 pallet load space. This make comparison between results with / without overhang easy to appreciate.

5.10 Comparison of loading on two pallet sizes.

There may be occasions when products being designed / packaged are to be stored or distributed on two different pallet sizes - e.g. 1200 * 1000 and 1200 * 800 and you would like to examine the relative efficiencies of each design on each pallet on the same screen. PALLETMANAGER is able to calculate and display such results using a logical extension to the overhang analysis referenced above.

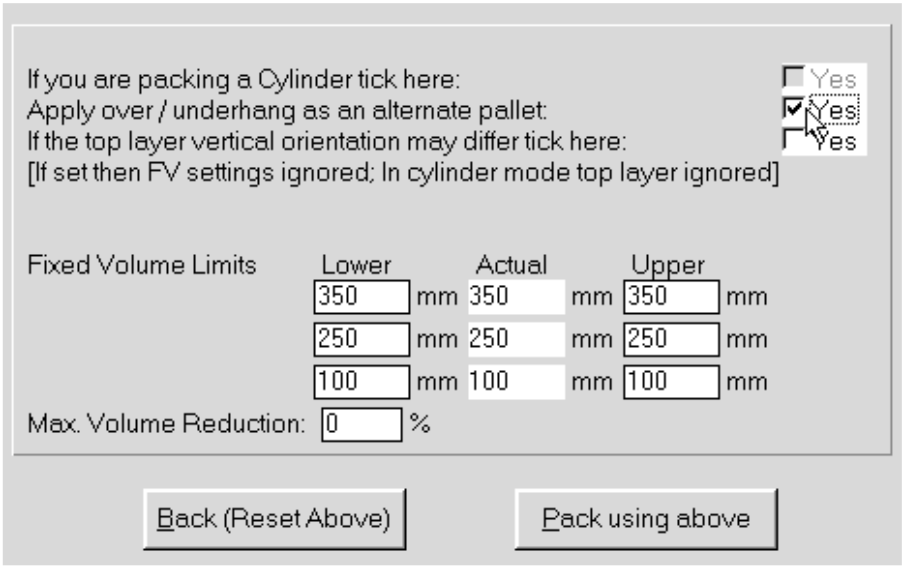
If we assume that the two pallet sizes of interest are indeed 1200*1000 and 1200*800 then the following procedure can be used.

- Input case or primary details in the normal manner using Palletise / Collation / Tertiary modes.
- At the point where you input / select a pallet size choose (say) a 1200 * 1000 * 1620 pallet size.
- Input underhang / overhang values which would transform the chosen pallet size to the alternate size (in this instance a value of -200 on the shorter dimension.)



At this point one could select 'Pack' and obtain results for two load spaces as per the Overhang analysis described in the previous section. Whilst these results would be valid the area / volume utilisation figures **would not** allow you to make statements such as 'on the 1200*1000 pallet we achieve a 95% fill whilst on the 1200*800 pallet we achieve a 92% fill'. This is because of the basis on which area / volume utilisation are calculated in overhang mode as described earlier.

To enable an appropriate set of comparable utilisation figures to be obtained select the **Advanced** option (not Pack), and tick the box '**Apply over / underhang as an alternate pallet**' and then 'Pack using Above'.



PALLETMANAGER will then calculate area / volume utilisation of each pallet size independently and thus allow a realistic comparison of load efficiency on each (this is discussed in more detail below).

In the example screen below the first 3 results are for the given case size on a 1200*1000 pallet, with the following 3 entries being on a 1200*800 pallet (as described in the text towards the top of the screen).

This screen displays the 6 results ranked in order for Case Code:_
Primary Pallet Load Space: 1200 * 1000 * 1620 ht.
Secondary Pallet Load Space: 1200 * 800 * 1620 ht.
Solutions with a < marker to the right of the line are for the Primary Pallet size.
Please highlight any line of the result you are interested in and then select the appropriate button.

Ref No	Extnl Case Dimensions			Colln	Matl	PALLET Cases	Layer	% Fill Area	Vol	+Layer Ht.	Wt.	Cost Total	
1	350	250	100	N/A	N/A	208	16x 13	94	93	80		0.144	<
2	350	100	250	N/A	N/A	204	6x 34	99	91	130		0.147	<
3	250	100	350	N/A	N/A	192	4x 48	100	86	130		0.156	<
4	350	100	250	N/A	N/A	162	6x 27	98	91	130		0.185	
5	350	250	100	N/A	N/A	160	16x 10	91	90	80		0.188	
6	250	100	350	N/A	N/A	152	4x 38	98	85	130		0.197	

The results above show, for example, that a 1200*1000 pallet can accommodate 208 cases of size 350*250*100 high with a volume utilisation of 93%. However the same case size **and orientation**, entry 5 in the table, when fitted on a 1200*800 pallet can only load 160 cases (naturally a smaller number given the smaller pallet size), and achieves a 90% utilisation on that (smaller) pallet.

In practice one would need to consider the relative volumes of product being transported / held on the two pallet sizes in order to decide whether to choose a case size / orientation which gave an optimal loading on one or other of the pallets, or to use a case which performs moderately well on both pallet sizes (for example 350*100*250 high which achieves 91% utilisation on both pallet sizes.

Hopefully the above discussion has made it clearer why the basis used to calculate utilisation on this screen necessarily differs from that used in standard overhang analysis.

5.11 Container Fill.

We have recently added as a result of user feedback a new **ContFill** option which can be accessed using the **ContFill** button on **Screen 5**.

Screen 5 (the tabular ranked results screen), obviously provides users with information on the efficiency with which cases can be loaded in stacks given limits on stack length, width and height. This might typically represent the efficiency of pallet loads within a racked warehouse environment.

However a number of our users are either receiving goods from suppliers in containers or trailers, or will be using containers / trailers to 'export' goods which might initially held in warehouse racking. Whilst such goods might be 'loose filled' into containers / trailers (something which our CARGOMANAGER software is designed to solve), to minimise handling requirements it is increasingly common to load containers with stacks of product (on pallets or plastic slipsheets), using stacks whose length and width match the pallet racking of the warehouse environment. Thus the stacks might be 1200*1000 or 1200*800 in the European environment.

The Contfill option shows instantly how well the given product fits within each of a number of standard (user defined) containers. [As this is a new feature we would be keen to hear form users on how we might best develop this facility in future releases]

As will be outlined below the use of stacks of (say) 1200*1000 or 1200*800 - on either pallets or slipsheets does **not** make very good use of the space within any container size. We should mention a companion product SLIPSHEET MANAGER which allows users to appreciate the impact that using stacks of non-

standard sized might have on container/trailer load efficiency.

Pallet sizes rarely match the internal dimension of containers. For example when using a UK pallet (1200*1000) - or even free stacks / slipsheet stacks of the same size footprint - then even if the product is sized so that it utilises all the available container height, then best %fill that can be achieved are as given below:

Container Description	Maximum % fill possible
20' standard container (5900*2352*2393)	86.5%
40' standard container (12035*2350*2393)	93.3%
40' high container (12035*2350*2577)	93.3%
45' high Container (13582*2347*2696)	90.3%

These figures **ignore** completely the height of any pallet in use.

Given the above figures it is not surprising that many companies are now considering using (a) custom pallet sizes or (b) use of slipsheets of standard or custom sizes or (c) packing cargo as loose items in order to obtain far higher container utilisation figures. Our own specialist software products **SLIPSHEET MANAGER and CARGOMANAGER** can help you maximise container fill.

Where goods must be packed using standard sizes (e.g. 1200*1000) in both the warehouse and container then **Contfill** can instantly provide you with information on the load efficiency when using various container sizes.

5.12 Using Contfill.

Inbuilt into PALLETMANAGER is a small database containing details of the internal dimensions of 4 common container sizes. This can be viewed and edited using the **Container** button on the opening screen (Screen 0). The sizes held are typical of those encountered in practice but when using this Contfill function you should ensure that they reflect the actual sizes available to you.

Of particular importance is the **Internal Height** value held for each container as it is this figure which usually has the greatest impact on load efficiency. There are various considerations which need to be made when specifying these values:

- If goods within the container are to be block stacked on the floor or block stacked on slipsheets (which have negligible impact on the stack height), then the height specified can be set equal to the total available container loading height.

- If goods within the container are to be palletised using a single pallet for each stack then the height available (in the Container Database) should be reduced by the height of that single pallet (say 160mm).

Once the Container Database is configured then it should not need to be changed on a regular basis. As noted on screen the first 6 characters used for the Container Description will be used to 'head up' results columns.

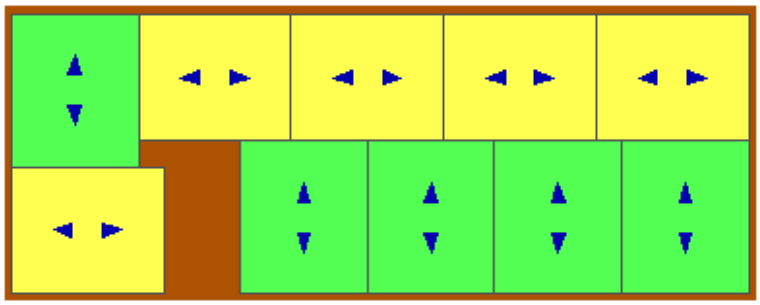
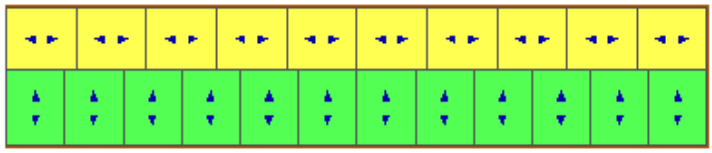
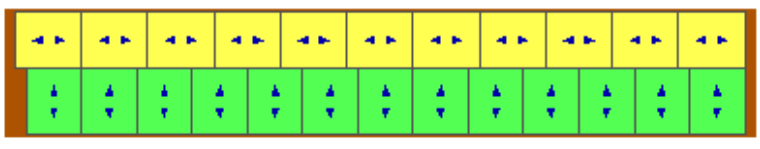
When running a PALLETISE / COLLATION / TERTIARY problem through PALLETMANAGER then on Screen 5 (the tabular results screen) the option **Contfill** can be selected. This will show the % efficiency with which any given solution will fit into the 4 different containers together with the number of primary units (Collation) or cases (Palletise) which can be fitted in stacks (using the same stack size footprint as is being used for the Palletise / Collation exercise).

When using this function, especially in Collation mode, and most especially when various collation quantities might be used, the following may be noted:

- The result which provides the best %utilisation in the Palletise / Collation exercise may not perform as well in terms of container fill.
- Frequently a slight 'lower ranked' solution in the Palletise / Collation exercise may provide better container utilisation (perhaps at the expense of a slightly lower pallet utilisation in the warehouse).
- There will be typically be considerable variation in % utilisation for any given solution across the various container sizes - this is part reflects the Maximum % fill possible figures detailed in the table a little earlier.

If the product **weight** is such that the load in the container would exceed the weight limit then **Contfill** will automatically reduce the quantity packed and the % fill amounts by the necessary amounts. When this occurs the % fill figure for that container will be followed by a **W** to indicate that the container weight limit has resulted in a reduced load (e.g. 75.4%W). In Collation mode the number of primary units fitted when weight limits applied may vary slightly from line to line if a weight value have been assigned for packaging material.

The **Contfill** function does not display diagrams as to how the stacks would be placed in the container. However for standard pallet sizes the number of stacks and their placement within a container are well known (certainly by warehouse staff), and the placements for 1200*1000 stacks into common container sizes are shown below.

20' Container (10 stacks of 1200*1000)	
40' Container (22 stacks of 1200*1000)	
45' Container (24 stacks of 1200*1000)	

As discussed earlier improvements in load fill may be possible through either the use of non-standard stack sizes (**SLIPSHEET MANAGER** can then assist), or obviously using loose fill of cargo (in part or in whole) - here **CARGOMANAGER** could be of assistance.

5.13 Other improvement techniques.

Where the case or primary size input is not totally fixed then the Fixed Volume module can be used to optimise the dimensions of a primary / case within your prescribed limits while maintaining the volume of product within the case. See Section 7 for further details of the **Fixed Volume** module.

Again, where the size of the product / case / amounts of packaging etc are not totally fixed the **Do Better** button available on the Results Summary Screen (Screen 5) provides a powerful set of tools to see exactly what change would be require in the dimensions to achieve more / pallet layer. This is described in detail in Section 15 of the manual.

The **Cube** module is specially designed to efficiently fill a container, a shipper or perhaps a caged pallet where interlocking is not a requirement. This is described in Section 8.

It should also be mentioned that a specific section of the manual - Section 16 - is dedicated to problems involving the **packing of trays or tote boxes** with product.

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SECTION 6 -

Further Collation Mode Features.

(Covers: Introduction, Input screens, Results screens, Improving results, Layout selection and printing, Nesting of primary units, Case strength module, Primary Image Display, Graphics Image Requirements)

6.1 Introduction.

The discussion in Section 5 on techniques for improving solutions covered techniques which were typically valid when using any of the modes Palletise, Collation or Tertiary. This Section provides some additional information relating to Collation mode and describes in great detail the Case Strength module.

6.2 Input Screens.

After selecting Collation mode, Screen 2 allows entry of primary unit details. This takes an identical format to input in other operating modes. Of note here are:

Primary Dimensions are normally held to 1 decimal place (e.g. 88.2), but on systems where STORE is not enabled 2 decimal places can be used.

Primaries/Case is the number of primary units that are to be contained in the 'case'. The range is now 1 to 2000.

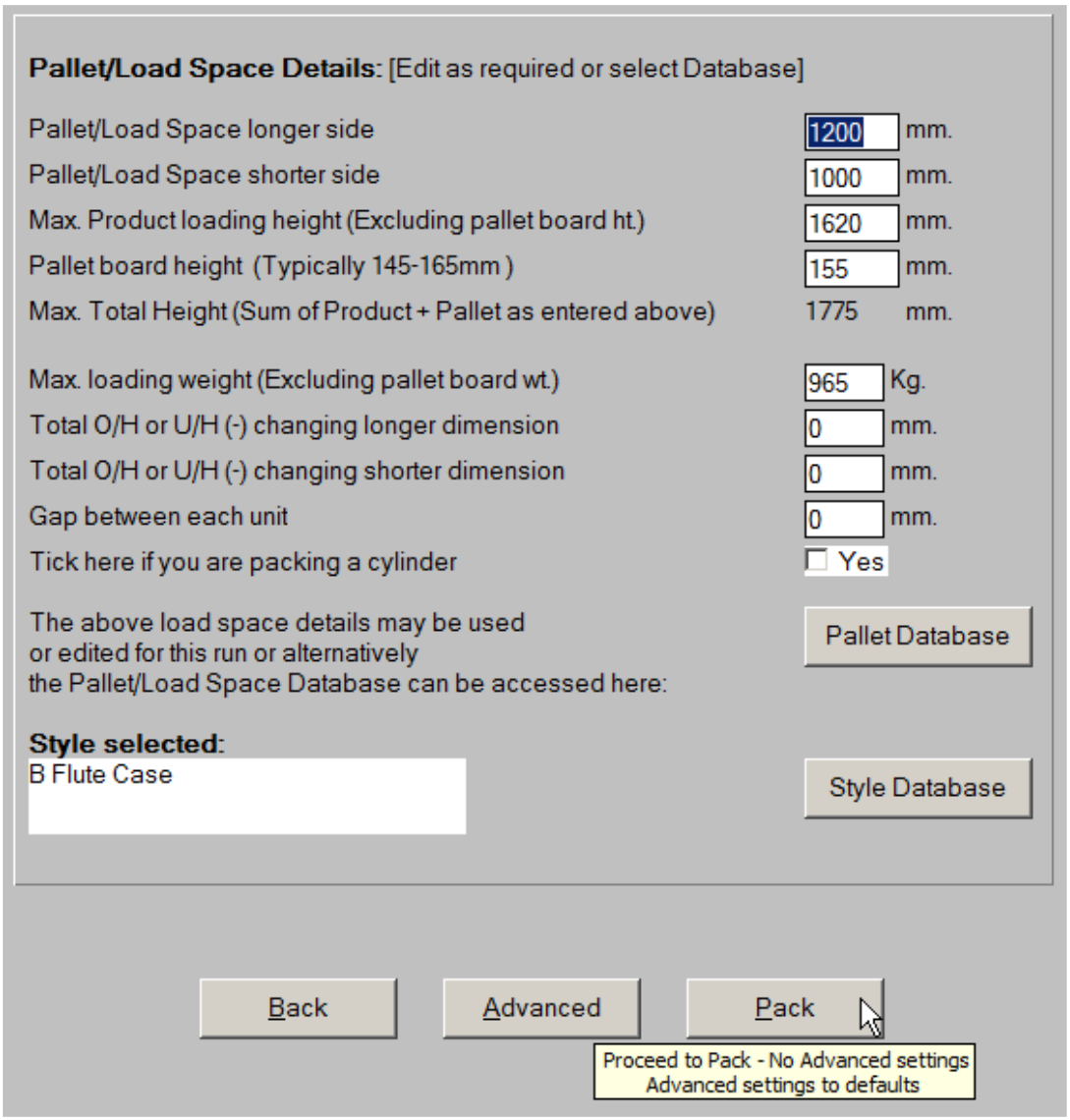
The ability to specify a collation of 1 unit has been provided to cater for users who wish to determine the external dimensions of a case (together with the palletisation layouts appropriate) from its internal dimensions.

Annual Case Volume is the number of cases, each containing the number of primary units specified above, which are produced annually.*

* At a later stage, once all product details have been entered, users may specify alternate collation quantities as described below. If this is done then the entries for Units / Case and Annual Case Volume are used to calculate the annual production of primary units. This is translated into appropriate case volumes for each collation quantity. Thus one is able to compare packaging and distribution costs for different collation quantities on a common basis.

This version of PALLETMANAGER caters for up to 300 cases on each pallet layer, and up to 2000 different potential case sizes in a single run.

On selecting **Continue** Screen 3 - Pallet and Style selection is displayed:



The details or the pallet loading area can be editing on this screen (for this run only) or the Pallet Database and/or Style Database can be accessed to select suitable values for Pallet and Style.

Details of both databases is given in Section 4.

Normally from this screen the **Pack** option would be selected, however the **Advanced Options** button (discussed also in Section 5) provides access to the following additional facilities:

Selection of Cylindrical Packing Option:

Unless the advanced options screen is selected the dimensions entered for the primary will always be assumed to relate to a cubic item. A tick box on the Advanced Options screen (Screen 4) - or above on Screen 3 - allows you to indicate that a cylindrical item is being packed. Full details on all aspects of cylindrical packing are given in Section 10.

Selection of alternate collation quantities:

Also available on the Advanced Options screen is the ability to specify alternate collation quantities to be used in addition to that specified on the Primary Input screen.

You can enter up to 3 distinct alternate collation quantities, or, alternatively, a range of quantities between a lower and a higher value. If you wish to enter a range (e.g. 4 to 12) then enter the lower limit as Alternative 1 and enter -12 as Collation Alternative 2. (Notice the negative sign). Values up to 2000 may be specified as

individual values but for a range the upper limit is 999 (i.e. -999).

These values are considered at the same time as the 'expected collation quantity', and the results for all collation quantities are tabulated together. In doing so the figures entered on Screen 2 for Primaries / Case and Case Volume are used to determine the 'Annual Production of Primary units', and cost calculations for all collation quantities are based upon this common basis.

It is also possible to specify a 'step' value. Say in the above example there were practical reasons why the collation quantity must be multiples of 2. Using the above procedure would produce solutions (for 5, 7, 9 and 11) that were not acceptable. The Step value can be used to avoid this happening, and the entry in Alternate 3 (**if different from the standard collation quantity**) is used for this. To examine all collation quantities between 4 and 12 in steps of 2 you would make the following entries:

Alternative 1 (from) : 4

Alternative 2 (to limit) : -12

Alternative 3 (in steps of) : 2

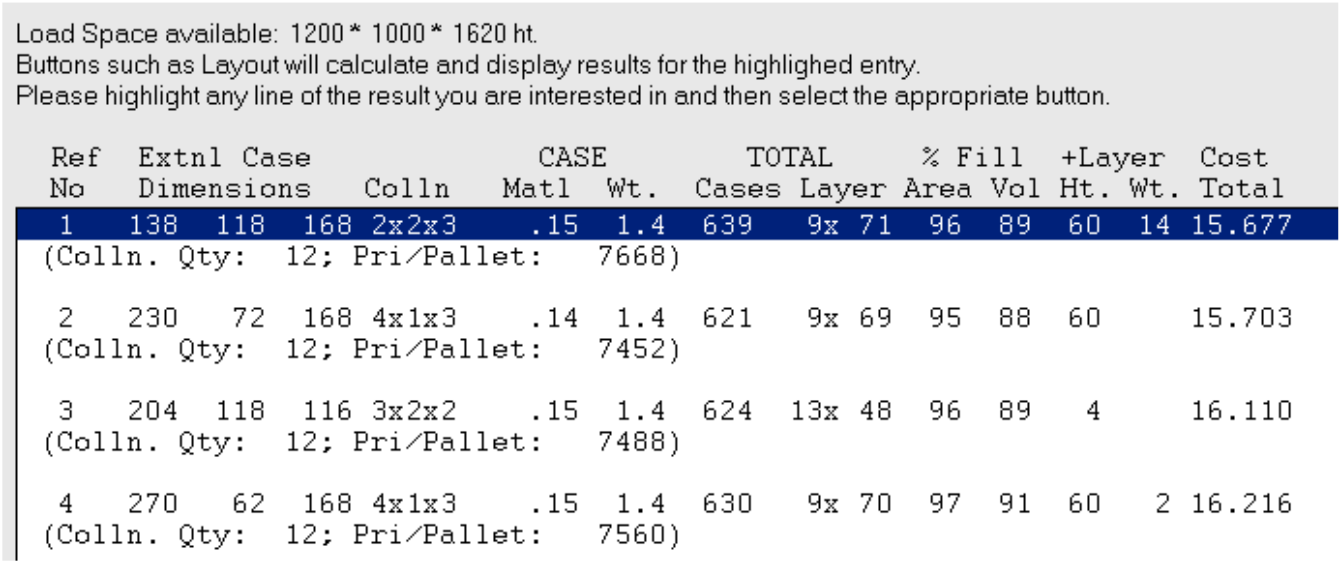
The original collation value specified, together with values of 4, 8, 10 and 12 will be examined.

Sensitivity analysis on size using the Fixed Volume module.

If the primary dimensions entered earlier might, if advantageous, be varied in any way then the Fixed Volume module - Selected from the Advanced Options Menu - can provide an effective mechanism for performing such an analysis - full details are given in Section 7 of this manual.

6.3 Results Screens.

When **Continue** is selected from either Screen 3 - Pallet & Style Selection, or Screen 4 - Advanced Options, case sizes are generated, those which exceed user limits discarded and the palletisation efficiency of those which meet user constraints are calculated. Then these results are ranked according to cost. Cost information provided by the user on the Pallet and Style database screens are used to calculate transport and packaging costs for the annual case volume defined earlier on Screen 2. (If cost values have been set equal to zero then the report in ranked according to the number of primary units fitted per pallet.) A ranked list of results is then presented and you can browse through these before using the left mouse button to highlight the design you wish to investigate further.


Load Space available: 1200 * 1000 * 1620 ht.
Buttons such as Layout will calculate and display results for the highlighed entry.
Please highlight any line of the result you are interested in and then select the appropriate button.

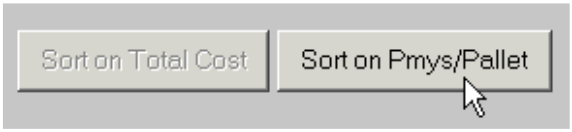
Ref No	Extnl Case Dimensions	Colln	CASE Matl	CASE Wt.	TOTAL Cases	TOTAL Layer	% Fill Area	% Fill Vol	+Layer Ht.	+Layer Wt.	Cost Total
1	138 118 168	2x2x3	.15	1.4	639	9x 71	96	89	60	14	15.677
(Colln. Qty: 12; Pri/Pallet: 7668)											
2	230 72 168	4x1x3	.14	1.4	621	9x 69	95	88	60		15.703
(Colln. Qty: 12; Pri/Pallet: 7452)											
3	204 118 116	3x2x2	.15	1.4	624	13x 48	96	89	4		16.110
(Colln. Qty: 12; Pri/Pallet: 7488)											
4	270 62 168	4x1x3	.15	1.4	630	9x 70	97	91	60	2	16.216
(Colln. Qty: 12; Pri/Pallet: 7560)											

In Collation mode up to 2000 different case sizes (all of which will have met your stated constraints), can be

considered. The best 99 of these are reported.

The default ordering of both screen and printer reports is determined by the Annual Total Cost of that solution (where cost data has been specified), or by primaries per pallet otherwise. The External Case Dimensions quoted are based upon the primary unit details, the collation, material thicknesses and gaps and headspace.

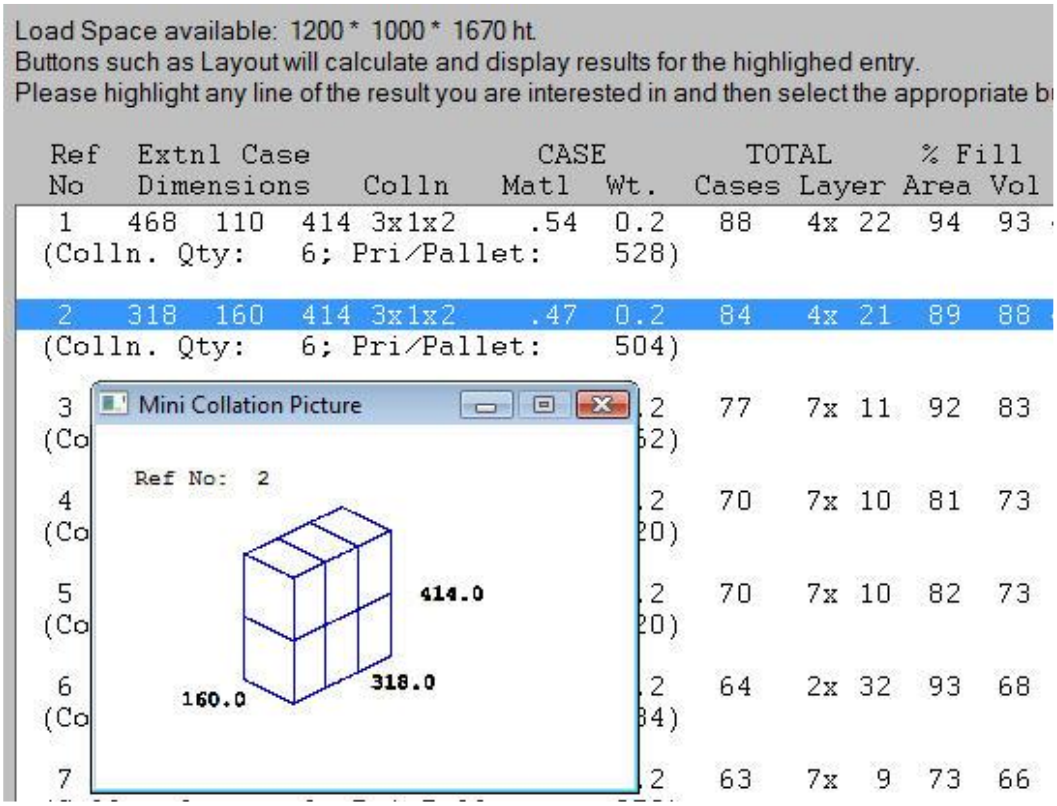
This very powerful ranking feature can result in the least cost solution not actually fitting the most units / pallet. The latest version now provided **an additional set of buttons on the tabular results screen (Screen 5)**, so that the display can be 'toggled' between the traditional cost based listing and one sorted according the the quantity of product / pallet.



Whichever ordering system is requested, then on the right hand side of the printout are given area and volume utilisation figures for each case, together with the amount by which height and/or weight constraints must be relaxed for an additional layer to be fitted.

When alternate collation quantities have been specified both screen and printout gives details of the collation quantity associated with each line of results, together with the total number of primary units per pallet.

We have recently added a further feature to Collation / Tertiary mode. In earlier releases users needed to highlight a table entry and then select Collation in order to view how a case was constructed. Now, as soon as an entry is highlighted a Mini-Collation picture is automatically displayed. This changes as each entry is highlighted.



There are situations where incorrect configuration of the software on networked machines might result is multiple such pictures being displayed as users browse through results. Whilst users can close any such window using the Closure control on the top right of the window, ideally your network configuration should be changed. This is discussed in Appendix 1.20.

6.4 Improving Results.

Both the Guided Tour and Section 5 of this manual provided a range of options available for results improvement. These included:

- ***The use of a small amount of overhang on the stated load area:***

Allowing some overhang can be investigated by using the **Back** button and changing the appropriate entries on the Pallet Details screen (Screen 3). PALLETMANAGER will calculate solutions both **with** and **without** the overhang you specify. The ranked solutions report will show a < symbol (less than) on the right hand side against solutions which do **not** use overhang. This makes it easy to see what improvement overhang might give.

- ***The use of the Fixed Volume module.***

The results presented are in all cases the best that can be achieved using the given case size packed onto the given pallet. However it may be that you have some slight flexibility in defining the loading height or weight, or you may be prepared to use a small amount of pallet overhang, or consider an alternate packaging specification. In addition it may be possible to use alternate collation quantities or reduce packaging allowances, or to vary slightly the primary dimensions using the Fixed Volume feature described in Section 7.

- ***The use of the Do Better function.***

This is selected from the Summary Results Screen - Screen 5. This is described in detail in Section 16 of the manual.

6.5 Layout selection and printing.

Having highlighted an entry for further examination selecting **Layout** brings you to the Layout Selection screen (Screen 6). Here the various optimal layouts for the highlighted solutions are presented and manipulated. This is identical to the process in Palletise mode and is described in detail in Section 5.

Having selected a pallet layout the following screen (Screen 7 - Notes, Screen and Printer Reports) allows you to enter additional notes to appear on the reports and to view / print these reports. In many instances the level of detail provided on the reports without the addition of notes will be sufficient. In Collation mode it is also possible to add information about the Case Style used automatically by selecting the **ColNotes** button. This 'toggles' between display /non-display of these automatically added notes.

6.6 Nesting of Primary Units.

In some instances the primary units may be such that they will nest into one another. Thus, for example, the height of a single primary might be 85mm, but if the product could be nested to a depth of 65mm, a stack of (say) 3 units would only require a total of 125mm.

It is possible to examine such situations by utilising the 'headspace' variable, which would normally only be specified if a gap was required in a case above the packed product.

In the example quoted here a product height of 20mm could be specified together with a headspace value of 65mm. The product height would be entered on Screen 2 and the headspace on the Packaging Style specification screen.

Thus a single 'layer' of product would require:

65mm + 20mm = 85mm

and each additional layer would add 20mm to the height required.

6.7 Case Strength Module.

The remainder of this section of the manual considers the Board Selection module available in Palletise, Collation and Tertiary modes of operation. This module provides some guidance of the influence of case design on stacking strength.

It should be emphasised from the outset that the types of PALLETMANAGER output produced by BoardSel can only be used in conjunction with your own experience and judgment to specify appropriate materials and safety factors. They should always be treated as a guide which should be verified by Case Designers etc.

On the Tabular Results Screen (Screen 5), selection of the **Advanced Options** button allows you to select the **BoardSel** Option.

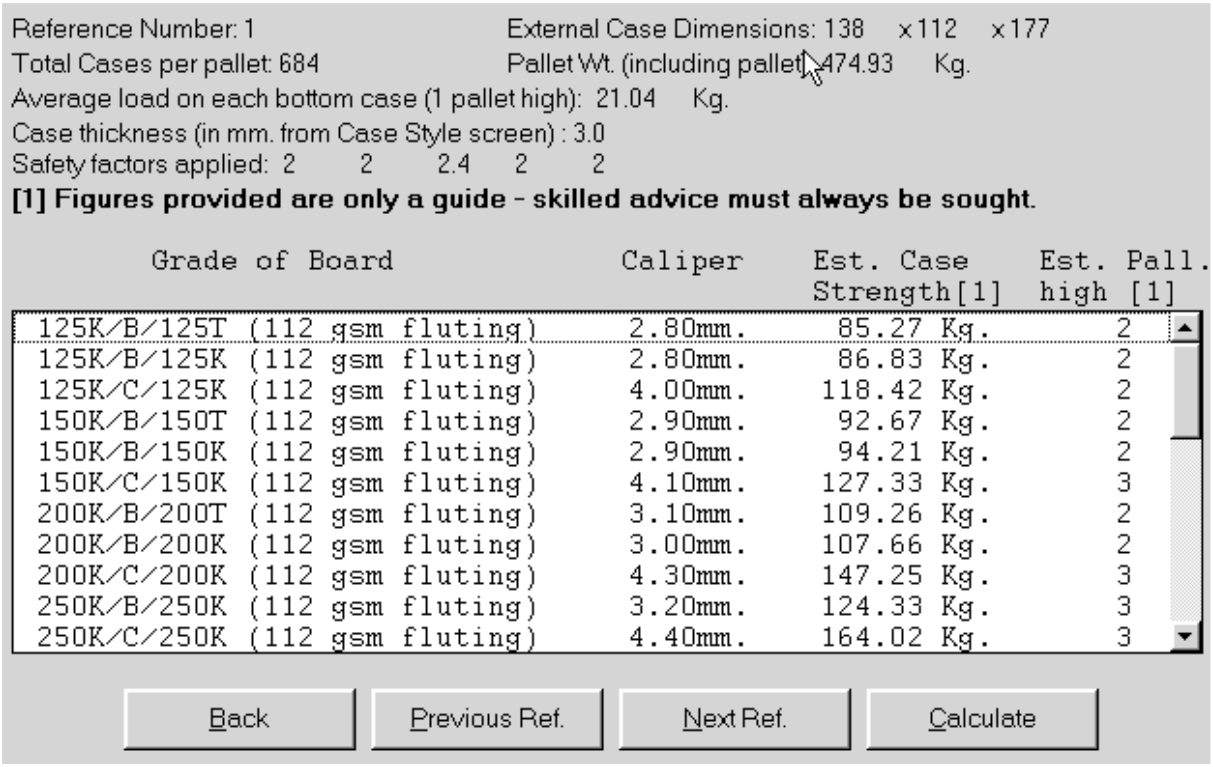
The information displayed and printed in the BoardSel module is partly derived from the information you enter on the main input / pallet and style screens, and partly from a user modifiable database of potential case materials and their characteristics. When first installed this database contains a set of information derived from a series of case studies conducted by one PALLETMANAGER user, but the database information will in all likelihood require to be customised be you so as to meet your individual requirements.

The output from the analysis comprises of the following information:

- The case size, number of cases per pallet, and total pallet weight.
- The average load on each case at the bottom of a one-high pallet stack.
- The case thickness specified by you on the Case Styles screen earlier in the analysis (in Collation / Tertiary modes). This value has been used in the calculation of the external case dimensions.
- Information of the various safety factors which have been applied. These are discussed later.
- For various grades of board (the names and characteristics of which are held in a database which is described later), the following is presented:
- Description of the board type (from the database).
- Caliper (thickness), obtained from the database.
- The estimated compression strength of a case of the above dimensions in Kg. The basis of this calculation is described later.
- The number of pallets high which calculations suggest this board thickness could support given the information supplied. Once again the basis of the calculation is described below.

It must be stressed that the above calculations, although based upon procedures which have been found to be successful in practice, will be influenced by a variety of different factors. They are also based on initial database entries which may well need to be modified in the light of your specific application.

A typical results screen (Screen 5b) is shown below:



The estimated case strength using each board grade is given. This is influenced by various factors including the case dimensions and details of how this is calculated is given below. For each grade of board the suggested number of pallet high is also given. Once again the basis of this calculation is outlined below. In this instance most grades will only support a one high stack, though some of the thicker / heavier grades might permit a two high stack to be used.

Other grades of board (together with their associated strength and 'pallets high' information) can be displayed using the More option.

It is not necessary to restrict examination to the case reference number first selected. The Previous and Next Reference buttons options can be used to view information on other case reference numbers. You will notice that other reference numbers may exhibit very different characteristics. The load on each bottom case will vary significantly as the number of cases per layer changes between different designs. This is also true of the Estimated Case Strength which depends on the case length and width values.

BoardSel - The Theoretical Basis

As users of PALLETMANAGER will be aware there are a wide range of approaches that may be used to determine case strength. The literature on the subject is very extensive and no single approach can be said to dominate.

It is generally accepted that the compression strength of a case is a good measure of the overall strength, robustness and rough handling resistance of the case. The following factors are of particular importance:

- The edge crush resistance of the corrugated board.
- The thickness of the corrugated board.
- The case perimeter.

In addition to these, defects caused by faults in conversion may impair the case compression strength considerably. The first requirement, in specifying a case construction, is to determine the "Compression Failure Load" (CFL) of the case. Once a value for the case CFL has been established a construction can be chosen that will meet the requirements.

Thus we are faced with determining:

A. The load likely to be experienced by a case given the product weight, the number of cases / layer and the loading conditions.

B. The likely strength of a given case design.

A. The Potential Load on a Case.

The Compression Failure Load (CFL) is the likely maximum load which any case in a given pallet stack is likely to encounter.

a) Single Height Pallet Loading

In some situations a single pallet may be stacked to a given height limit without any additional pallets being placed on top. In such circumstances the load likely to be experienced by the bottom-most case in the stack can easily be derived from the formula:

Load = (Stack Height - 1) * Pack Weight

Pack Height

To calculate the required C.F.L. it is usual to apply correction factors of:

Climatic Correction: * 2.0

Time-in-Stack: * 2.0

*The value given on screen / printer for Average Load (CFL) is calculated using the above formula and assumes the *2.0 adjustments for climatic and time-in-stack factors. As described later these correction factor defaults may be changed by the user*

b) Multiple Height Pallet Loading.

When considering loads experienced by packs during palletised distribution (where several pallets may be stacked on top of one another), it is necessary to consider the effect of the pallet itself on load distribution.

For pallet loads stacked more than one high the point of maximum stress on the cases is transferred from the bottom cases of the whole stack to the top cases on the bottom pallet load. Thus in a multi-pallet stack we need to calculate the load on the TOP layer of the bottom pallet and apply to this appropriate correction factors. Thus, for a two high pallet stack the calculations would be:

(Pallet Weight / No of packs/layer) * Pallet base board factor

The pallet base board correction factor accounts for the fact that most pallets are NOT close boarded. A value of 2.4 is typically suggested, though this default value may, as described later, be modified by the user. In addition, once again climatic and time-in-stack factors need to be applied. Values close to 2.0 are typically used for both of these, and initial default values of 2.0 are applied by PALLETMANAGER.

An example of the calculations carried out in such a situation is given below:

Example:

Pack Weight: 21.36 kg; Pack Dimensions: 400 x 300 x 315 mm

Pallet Load Weight: 666 kg; No. Packs/Layer: 10 - Uses a 2 High Pallet Stack

Load on a pack = Pallet Weight /(No per layer)

This result is then multiplied by the pallet base board correction factor.

= (666 / 10) * 2.4 = 160Kg.

Additional safety factors (of 2.0) for climatic conditions and for the time in the stack are then used to multiply the above figure to give the required Compression Failure Load. In this instance a Compression Failure Load in this instance would therefore be of the order of 640kg.

The calculations used for stacks of 3 or more pallets are similar to the above.

Thus, for a given pallet load the maximum stresses experienced if stacked 2, 3 or more pallets high will be calculated by PALLETMANAGER. This is then compared with the strength offered by various board grades, and the result - the maximum number of pallet loads which should be considered - reported on screen and printer.

The calculation of the strength of a given case is the subject of the next section of the manual. Examples of alternative values for both fatigue and climatic factors are given overleaf:

Duration of Load	Stacking Factor
Short Term	1.0
10 days	1.5
30 days	1.7
100 days	1.8
1 year	2.0
Humidity %RH	Stacking Factor
DRY	1.0
25%	1.1
50%	1.25
75%	1.55
85%	2.0
90%	2.5

In PALLETMANAGER initial defaults of 2.0 are used for both these factors but as described later these may be modified by the user.

B. The Likely Strength of a Case Design.

Once again a wide range of alternative formulae have been proposed to predict case performance but given the variability of materials and suppliers this must necessarily be treated with some care.

A formula which is applied by a number of PALLETMANAGER users is based on the Edge Crush, Board Caliper and external dimensions of the case. PALLETMANAGER has information on external dimensions, and utilises a user database to hold details of Board Type, Edge Crush and Board Caliper. The detail of the database, and how it may be modified, is given later.

The suggested formula is:

$(1.515 * EC)^{0.57} * CAL^{0.87} * (L + B)^{0.47} * 0.9$

= Theoretical Case Compression Strength.

Where EC = Edge Crush (kg/cm)

CAL = Board Caliper (mm)

L = External Case Length (mm)

W = External Case Breadth (mm)

This formula includes a 10% reduction factor to account for conversion damage.

This calculation is automatically carried out in PALLETMANAGER when the BoardSel option is selected. We therefore have available:

The predicted loads which the most loaded case in a stack will experience, either in a single stack or when loaded two or more pallets high.

The predicted performance of a case made of fibreboard of a particular type. Thus PALLETMANAGER is able to present:

- The estimated compression strength of a case of the calculated dimensions in Kg.

- The number of pallets high which calculations suggest this board thickness could support given the information supplied.

The Compression Analysis Screen (Screen 5b).

The Compression Analysis screen allows you to browse through the various board grades held in the database using the scroll bar.

Also, although before entering the BoardSel option you Selected one of the available case reference numbers, you are able to browse through all those displayed on the previous Results Summary screen (Screen 5a) examining the implications of case design on compression strength.

You may also move on to **Calculate** layouts for the currently displayed Case Reference Number. Selecting **Back** returns you to the Results Summary Screen.

You should note that the screen / report also indicates above the tabulated information the Case Thickness specified by you as part of the Case Style information. This thickness is the one which is used to determine the external dimensions of a case.

It is important that the Caliper value for the Board Type you eventually choose matches that of the Style record. If it does not, then the actual case (of stated internal dimensions) will, of course, have external dimensions greater than or less than those calculated within PALLETMANAGER.

The 'Pallets High' Estimate

For each grade of board in the database an estimate of the number of pallets which can form is stack is given. This is done by reference to the various calculations described above and it must be stressed that the basis of this depends heavily on the edge crush strength (from the database), and on the compression strength formulae and 'safety' factors detailed earlier. In addition, it is important to take account of the handling to which the pallets are to be subject, and the type of pallet pattern which you will subsequently select. Our software can only provide a guide as to what is likely to be successful in practice.

The theoretical strength calculations for a case assume that it is placed in its 'normal' (stronger) vertical orientation. If palletisation solutions are chosen in which case orientation of the top layer differs, then the above analysis clearly is INVALID.

The "Compression" Database.

When PALLETMANAGER is installed a sample database file is provided. This contains:

Values for the five safety factors described above, they are (in order):

- The Climatic and Time-in-Stack factors applied for single high pallet loading. Initial values of 2.0 are used for these.
- The pallet base board correction factor. An initial value of 2.4 is used for this.
- The Climatic and Time-in-Stack factors applied for multiple high pallet loading. Initial values of 2.0 are used for these.

These five values are found, in the order given, on the first line of the file COMPRESS.DAT. This file will be found in the PALLETMANAGER directory and is accessed every time the BoardSel option is selected.

The five values must all have a decimal point and be spaced apart on the same line. The following lines (up to 50 entries, beginning on line 2), contain details of board types. Specifically:

- Board Grade Description,
- Edge Crush (Kg/cm),
- Caliper (wall thickness - mm).

The database can be viewed and edited using a simple editor (EDIT for example), as long as the exact layout / length of entry is maintained. Thus, given knowledge of the Edge Crush and Caliper of other board types these can be added to the database. Unused board types can be easily deleted.

6.8 Primary Image Display.

[The text below (6.8 and 6.9) has been updated slightly from some of the printed material in the light of late implementation changes.]

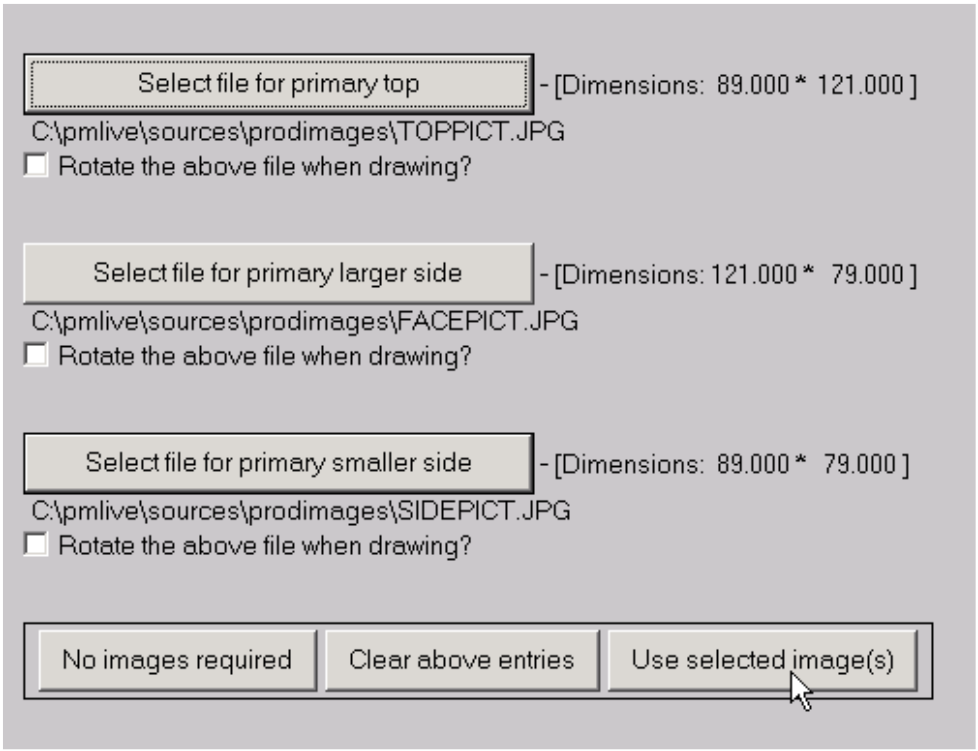
PALLETMANAGER reports as standard do not include any detailed graphics images of the products being packaged - the primary units - these being represented and displayed in simple cubic or cylindrical forms. In most instances such a presentation is quite sufficient.

However we have now introduced a new feature in COLLATION mode - the ability to merge graphics images of cubic primary units onto the palletise and collation screen / printer and Webbase reports. This feature is described below:

Immediately prior to the display and printing of reports Screen 7 is displayed (or in STORE mode Screen 9). Both screens allow you to select which reports you wish to view on screen / print / email etc. A new option on this screen - Primary Images - only displayed in Collation mode - allows you to bring up a screen from which you can select graphics files which will superimposed on the surfaces of the primary as displayed on Palletise and Collation reports.

The images chosen will **continue to be displayed / printed** as part of reports until either you re-select and change **Primary Images** or you return to Screen 5 (from where you select the case and primary that you wish to examine in more detail).

On selecting Primary Images the following screen is displayed:



To the left hand side of this screen are 3 large buttons which you can use to select graphics files (.jpg or .bmp) - details below - which will be superimposed on the 3 visible faces of each primary unit when Palletise and Collation reports are produced. Initially the entries for each picture (filename and location as shown) will be **blank**, but once you have selected a picture for a given face, details of this will be retained when you subsequently enter the selection screen, whether in the same session or subsequently.

Actioning any of the 3 file selection buttons will activate the standard file Windows selection dialogue you would use with any other application. You can browse your machine to find suitable images. **However** the starting point for this search is always a folder **prodimages** which is located directly below the installation folder you use for PALLETMANAGER (default c:\pmnt). It is suggested that this is a logical location in which to store product images to use with PALLETMANAGER. Such images may be produced by a wide range of different packages / tools.

The initial search option is for .JPG files but you can naturally change this (base of the selection box) to search for .BMP files.

Adjacent to each of the 3 large selection buttons are details of the dimensions of the primary face being

referenced. This is provided to assist you in distinguishing faces. You can of course view the Collation report to clarify things prior to selecting the graphics images to be superimposed.

You can select images to superimpose on any or all of the 3 faces. Having selected an image you can also request that the image is rotated through 90 degrees before being placed on the face. All images are normally superimposed on the selected face using the 'natural' orientation of the graphic - and will reduced in size or enlarged as necessary (keeping the aspect ratio constant) to cover the surface. It is suggested that you firstly view the Palletise and Collation reports using the default orientation before (if necessary) rotating one or more of the images.

At the **bottom of the screen** are 3 buttons:

No images required - this returns you to standard view / printing display screen. No images will be used when drawing, but details of graphics files selected (if any) whilst on this screen will be available when you re-enter the screen.

Clear above entries - this blanks out any entries made on this screen and then leaves you to make new entries or select either of the other two entries (i.e. No images required / Use Selected Images).

Use Selected Images - this takes the details entered - between 0 and 3 files selected - and moves you on to the standard view / printing display screen.

6.9 Graphics Image Requirements.

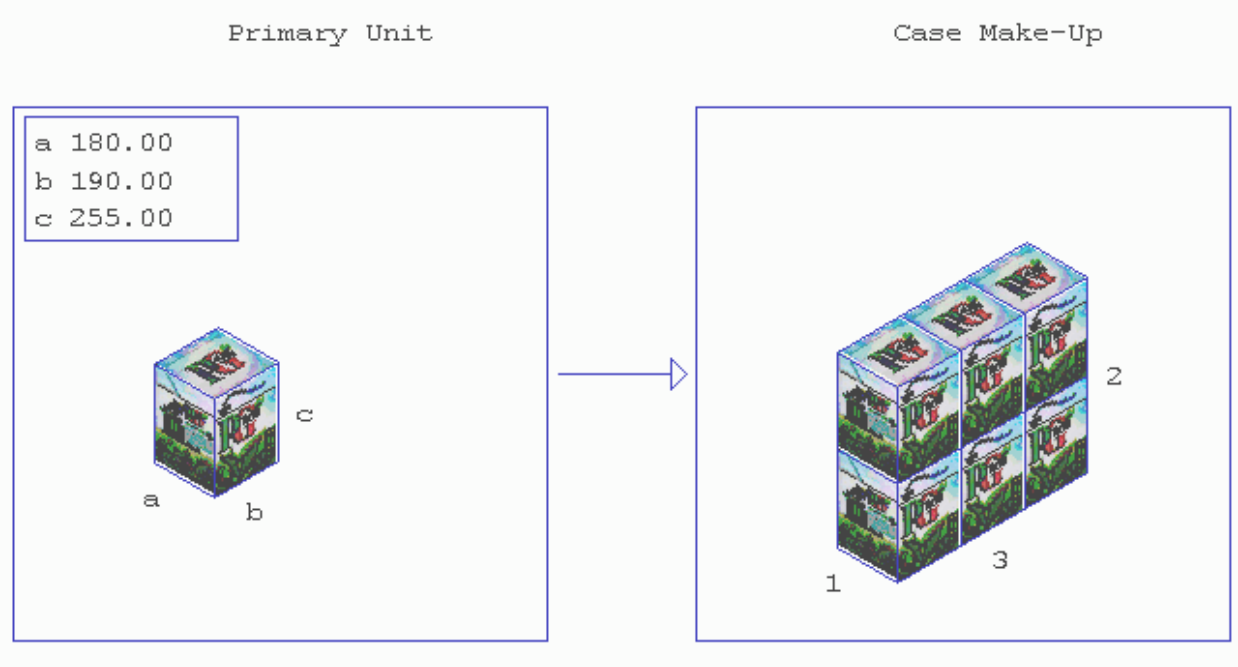
The above file selection procedure allows you to select either .JPG or .BMP images to be superimposed on the Palletise and Collation reports in Collation mode.

Images may be in 8 bit or 24 bit BMP format or 24 bit JPG format - a 24bit image is preferable. The most suitable size (pixels) for any such images will depend on many factors - the screen and printer resolution, the size of primary as drawn on the report page etc. You should also realise that the image will appear in perspective and thus any detail will necessarily be 'lost in translation'. This is a feature of the resolution possible on screen / printer and not of our software.

As a starting point the image provided should ideally have a height / width of around 200 - 500 pixels. If the image is of a product face then obviously this will / should have a length / width ratio **which equals** that of the appropriate product dimensions. As discussed earlier it is suggested that such images be stored in the folder **prodimages** which will be found directly below the folder in which PALLETMANAGER is installed.

Whatever image size is provided, this will be adjusted (up or down - keeping the length / width ratio constant) to fit the area available. Thus if the dimensions of a face of the product are (say) 200mm * 100mm, then the image provided should have a pixel ratio of 2:1 - otherwise part of the face will have white borders. If the images used are taken from the product (e.g. scanned or photographed) then the pixel ratio should naturally match the ratio of the product dimensions.

However, as discussed above, the translation of a rectangular image to be superimposed on a perspective view will inevitably cause some loss of image quality. It is suggested that you / your IT function experiment with various sizes of image. Given the differences that will always exist between on-screen and printer resolution the effect of size changes on both screen and printer operation should be tested. An example of how product images display as part of a palletisation report is shown below:



In this example the front face of the product was 145mm high by 108mm wide. An image file for this face of 510 pixels high by 381 pixels was used (the same ratio). The PALLETMANAGER Collation Report includes a larger view of the collated products and the quite large pixel count of this image produces a very good image reproduction at this larger size.

Further important technical notes:

1. The image sizes suggested above will on most devices produce a reasonably good image on both printer and on screen. Those using the Webbase function database should also test the output quality of images on the Webbase .JPG files.

2. Whilst images added to reports WILL be saved in the Webbase, they cannot be stored in the STORE database. Reports produced using superimposed images which are then saved to the STORE database will be reproduced in future (reprinted etc) without the superimposed graphics. However the same facility to superimpose images is available from STORE Screen 9.

3. Given the much reduced file sizes associated with .JPG files as compared with .BMP you may well prefer to use the .JPG file format.

4. Whilst images will display to screen without any noticeable delay there will be a slightly increased print time when printing reports containing images to a printer or a PDF printer system.

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SECTION 7 -

FIXED VOLUME

(Covers: Introduction, basis of operation, using Fixed Volume, FV results, FV for cylinders, Variable FV.)

7.1 Introduction.

In all modes of operation **PALLETMANAGER** will provide you with optimal pallet layouts for the given case / primary / sub-primary unit. However in doing so it is naturally limited by the dimensional values you provide for the product itself, the pallet load area and height, and the collation quantities and packaging materials used. Whilst the whole of the PALLETMANAGER suite of programs is ideally suited to you posing 'what if' questions (e.g. what is the effect of using different collation quantities), it may be that the size specified for the product itself limits the feasible options.

It may be that a change of 1mm or less to one product dimension could provide a vast improvement in pallet fill. The **Fixed Volume** mode of PALLETMANAGER is designed to optimise pallet fill in instances where some minor change to the product dimensions might be possible. It takes its name from the fact that when using Fixed Volume mode you can (if you wish) specify that the case / primary size must in any event have have a volume **exactly equal to the volume of the original product.**

Technically it is one of the most complex and powerful parts of the software suite and utilises unique and powerful optimisation techniques. However users will find that it is very easy to use.

In situations where the volume is not required to be fixed then the **Do Better** module may alternatively be used. This 'more automatic' function is accessed from the Summary Results Screen (Screen 5) and is described in detail in Section 16.

It should perhaps be mentioned here that even when the product size (e.g. a Case) is fixed (and thus Fixed Volume mode is not appropriate), then a palletisation improvement may be possible by simply allowing a few mm. of pallet overhang. The automatic examination of both 'standard' and 'overhang' arrangements is discussed in Section 5.

7.2 The Basis of this Module.

In instances where the volume of a primary unit or case is fixed, its exact dimensions may be somewhat flexible as long as the internal volume remains constant. In other instances the volume as such may not need to be fixed. Both are catered for in the Fixed Volume module.

One approach to solving such problems using the Palletise or Collation modules is to select (using a calculator and experience!) a set of possible primary or case designs and run each in turn through the appropriate module.

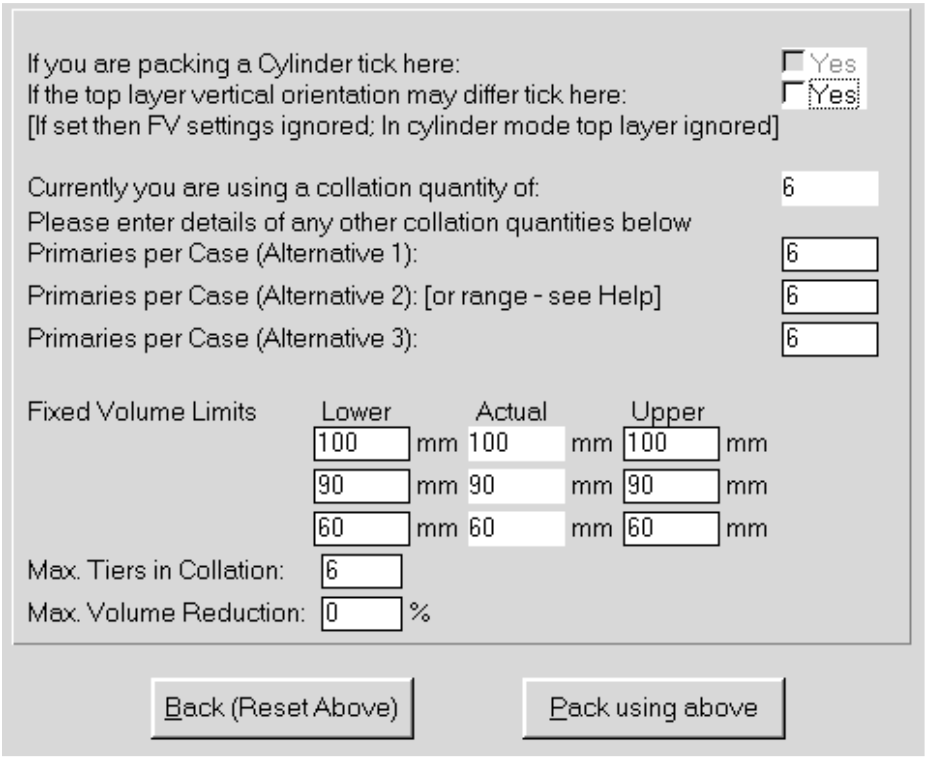
However, such an approach may not yield any improvement. The **Fixed Volume** module performs a far more powerful and systematic search for an improved solution using **unique and powerful algorithms** and in-built information on designs which may yield improved results.

In some instances the designs examined may have dimensions which are only fractions of a millimetre apart, but these may result in very different loading results. An approach based upon varying the dimensions in fixed steps of (say) 1mm would not be sufficient.

7.3 Using Fixed Volume.

The Fixed Volume module can be selected following data entry for either the Palletise or Collation modules from Screen 3 (where the pallet size is selected). Normally you will first examine your chosen primary or case using the standard Palletise or Collation modules, and you may well find that these produce a satisfactory solution.

In using Fixed Volume you should select the Advanced Options screen (Screen 4) and then complete details as described below. A typical Advanced Options screen is shown below. The one shown is for a Collation of 6 primaries, the size of each being 100mm * 90mm * 60mm.

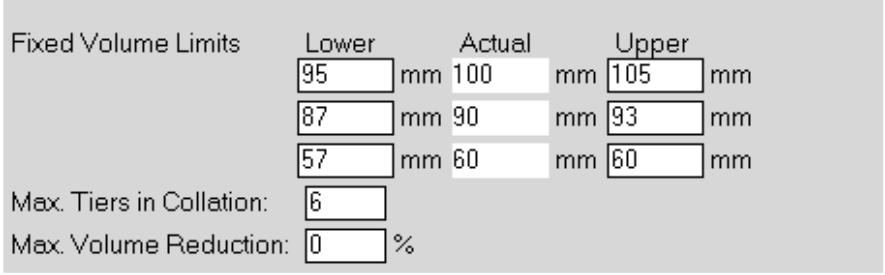


It is the entries in the **bottom half of this screen** which we will focus on in the discussion below.

On entry this part of the screen shows the 3 (Actual) product dimensions (100, 90 and 60) together with entries for Lower and Upper limits which that dimension may take. Initially these will be equal to the product dimensions as input. You can edit the lower and upper limit values for any or all of the values. In practice it is likely that any dimensional flexibility will be limited to just a few mm. either size of the initial values. (The program limits the range you can enter to extreme realistic values).

If you are optimising a primary (i.e. Collation mode as here), also enter the maximum number of collation tiers that you will consider. This will override the value stored for the chosen packaging specification.

The final data entry on this screen - Max. Volume Reduction - is discussed in a later part of this section - it can be left = 0 at this point. A typical completed set of entries is shown below:



Given the above information PALLETMANAGER will examine every feasible collation arrangement:-

1) with the original dimensions

2) with the height fixed at its original value and base dimensions varied within your limits

3) with the product height increased so as to provide up to three less layers on the pallet in each instance leaving little or no spare height. Once again base dimensions will be varied within your constraints.

4) with the product height reduced so to increase the number of pallet layers that can be accommodated in the available loading height by up to three, once again varying base dimensions.

During stages 3 and 4 the product dimensional limits you have specified will, if necessary, be used restrict the number of examinations carried out.

5) with dimensions for the primary / case having the exact values specified by you as upper and lower limits.

As you would expect, the number of calculations involved is very substantial and many hundreds / thousands of potential solutions may be examined so a short wait may be expected.

7.4 Fixed Volume Results.

The results which are obtained from this powerful module require some detailed explanation.

For a given problem, if you had **not** selected Fixed Volume, but had run Palletise or Collation with the specified dimensions, a number of solutions would have been obtained, each being based upon the stated product dimensions. In Fixed Volume the first stage performed is the examination and subsequent display of the results obtained using the exact dimensions specified. Up to 1000 different case sizes can be examined in a single run.

In addition, for each of the case sizes examined in stage 1, Fixed Volume considers other cases sizes which might provide a solution which is as good as, or better than, that achieved when using the specified dimensions. In doing so it examines all variations of case / primary size which fall within your stated constraints and whose case height provides either the same number of pallet layers, or values within +/- 3 of this value. In all instances the **internal volume** of the case / primary will be fixed to be equal to that of the case or primary originally specified, and the collation arrangement within the case will remain unchanged.

Thus the results obtained from Fixed Volume will include the set of results which would have been obtained had the Fixed Volume option **not** been selected (i.e. from Palletise / Collation) and, in addition, solutions which provide an improvement over those results. These latter solutions will retain case / primary volume whilst varying dimensions within constraints you have specified.

The number of possible solutions examined may be very large, and the time taken may be significant. However, the restriction of dimensional ranges to those which would be practically acceptable will of course reduce computation time.

The dimensions displayed on the Palletisation Report are, as with all modules, displayed to the nearest millimetre, and, because of this, two (or more) similar (or apparently identical) solutions may sometimes be displayed. These are, in reality, solutions which may vary by a fraction of a millimetre from one another. Frequently, a minor change in product size can yield a very substantial cost saving.

As stated earlier the Fixed Volume module can examine up to 1000 case sizes (each meeting dimensional / stability constraints) in a single run. As with the standard Collation report, the 'best' 99 solutions are displayed and printed.

7.5 Cylinder Option.

The Fixed Volume module can be used to investigate problems where cylinders (e.g. cans, drums) are to be packed either directly on the pallet (Palletise mode) or are to be collated. The **Advanced Options** screen (Screen 4) not only provides for Fixed Volume data entry but also provides a tick-box for cylindrial selection. Full details on patterns for nesting and other aspects of Cylindrical Nesting are provided in Section 10 of this manual.

7.6 Variable 'Fixed' Volume.

The discussions so far in this Section assume that the user has specified:

> A maximum and minimum value within which each dimension may vary.
>
> A set of primary or case dimensions which define the VOLUME to be retained in any Fixed Volume analysis.

The former parameters are typically somewhat arbitrarily selected on the basis that the user will eventually be able to choose from a variety of possible solutions. The latter values are typically the dimensions of an existing unit for which a modified and more efficient set of dimensions may be required.

PALLETMANAGER is also able to tackle problems where the volume of the existing unit need not precisely define the volume actually required. **There may be a little scope for volumetric change** - perhaps a one or two percent reduction. As part of the data input phase the user may define a percentage volume reduction which may be considered. As described above the default value is zero percent.

If a reduction is allowed then Fixed Volume analysis will be carried out using firstly the volume as specified (by the primary / case size entered), and then be repeated using the specified reduction percentage. Thus there will be **two sets of solutions** - one relating to the original volume and one to the reduced volume problem. In both instances the ranges on dimensions will be strictly adhered to. The results from these two runs will be merged together and ranked in the usual manner on both screen and printer reports.

It is obviously important that those results associated with a reduction in volume can readily be identified on both screen and printer and for this a V code is displayed following the Reference Number on both screen and printer. (This may be in addition to other codes described elsewhere relating to Cylindrical items). Thus a comparison may easily be made between solutions in which the volume is strictly retained and those which are obtained as a result of a slight volume reduction.

The printed report also indicates the percentage reduction which you specified as being permissible.

It is important to note that improved solutions utilising 'Reduced Volume' can only be obtained if the dimensional constraints are reasonably wide. Otherwise solutions will be identical to those obtained without reducing volume.

Once again we should mention the **Do Better** module which may be used where volume is not a major issue. This 'more automatic' function is accessed from the Summary Results Screen (Screen 5) and is described in detail in Section 16.

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SECTION 8 -

CUBE MODE.

(Covers: Introduction to Cube, Cube data entry, Cube Shipper Database)

8.1 Introduction.

The Cube module will produce a load specification for the packing of identical units (e.g. Cases) within any cuboid shaped outer.

At first glace this might appear similar to the analysis carried out in Palletise mode - Cases packed within the length, width and height limits of a pallet. **However** Cube mode solutions will utilise (if valid) **any** combination of layers so as to maximise fill.

Thus a case of size X * Y by * Z may yield a solution where (say) 4 layers with X vertical; 2 Layers with Y vertical and 3 layers with Z vertical are used.

In contrast Palletise mode solutions normally use just one vertical dimension throughout the pallet stack or, on occasion when selected, one vertical dimension for the majority of the stack with a different orientation top layer.

In this section we will refer to the inner unit as a **case**, and the outer cuboid shape as a **shipper**. Cube mode can cater for orientation constraints on the case, and can accommodate a single top layer in another orientation.

Cube might be used to:

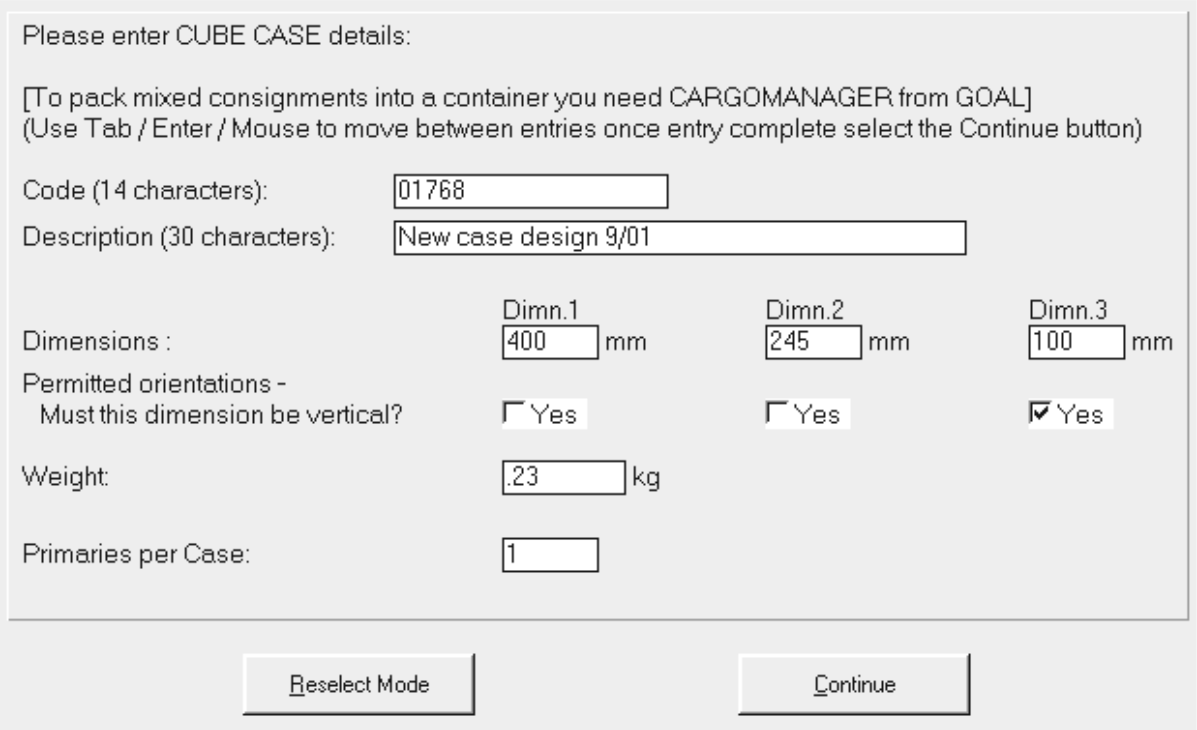
- Determine the efficiency of various shipper (outer) designs in packing a given case size.
- Calculate the efficiency of using one of a number of different pallet sizes for a given case.
- Determine the efficiency of loading a container with a number of identical cases. (our CARGOMANAGER software product is specifically designed for situations where a large number of identical cases, or multiple cargo types are to be loaded into one or multiple containers).

8.2 Cube Mode Operation.

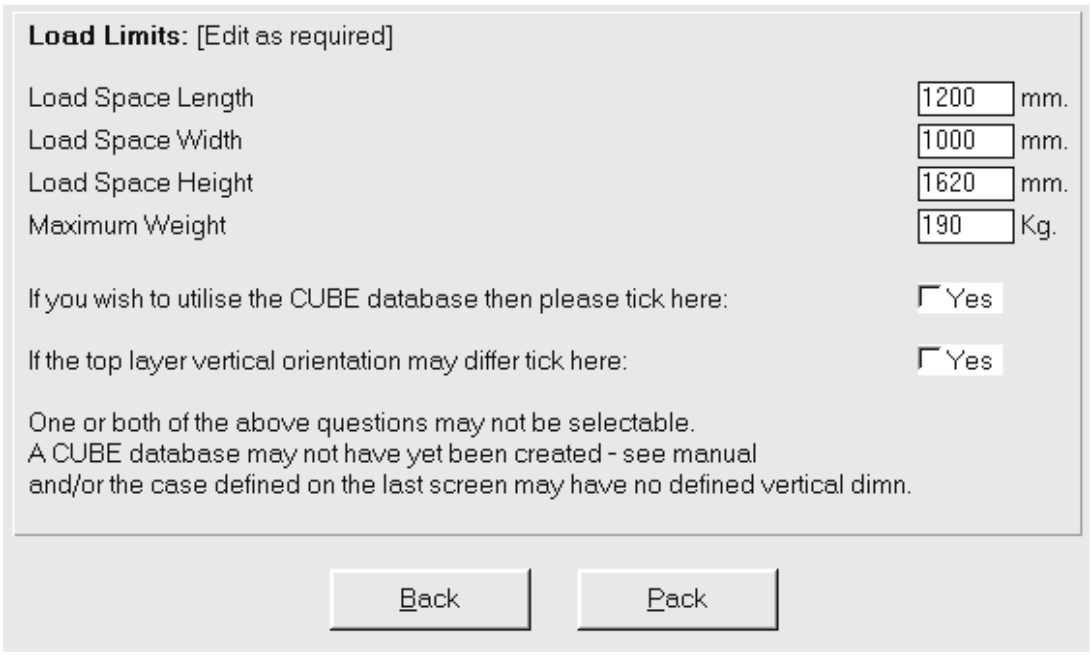
Having selected 'New Run' from the entry menu **Cube** may be selected. The data then requested is similar to that in other operating modes. It requires:

The three *case dimensions* which may be integer, or non-integer with 1 decimal place. Each value must lie in the range 2mm to 2500mm. Details of which dimension (if any) must be placed vertically.

The *weight of each case* in Kg. (0.0 Kg to 10000 Kg) and the *number of primary units* forming a case.



Having completed entries and selected **Continue** you are then able to specify the dimensions of the load space on Screen 3c:



Initial suggested values will be presented which can be edited.

The *length of the outer (Shipper)* (in the range 10mm to 32000mm)

The *width of the outer* (a value between 10mm and the length value given).

The *height of the outer* (in the range 10mm to 9500mm).

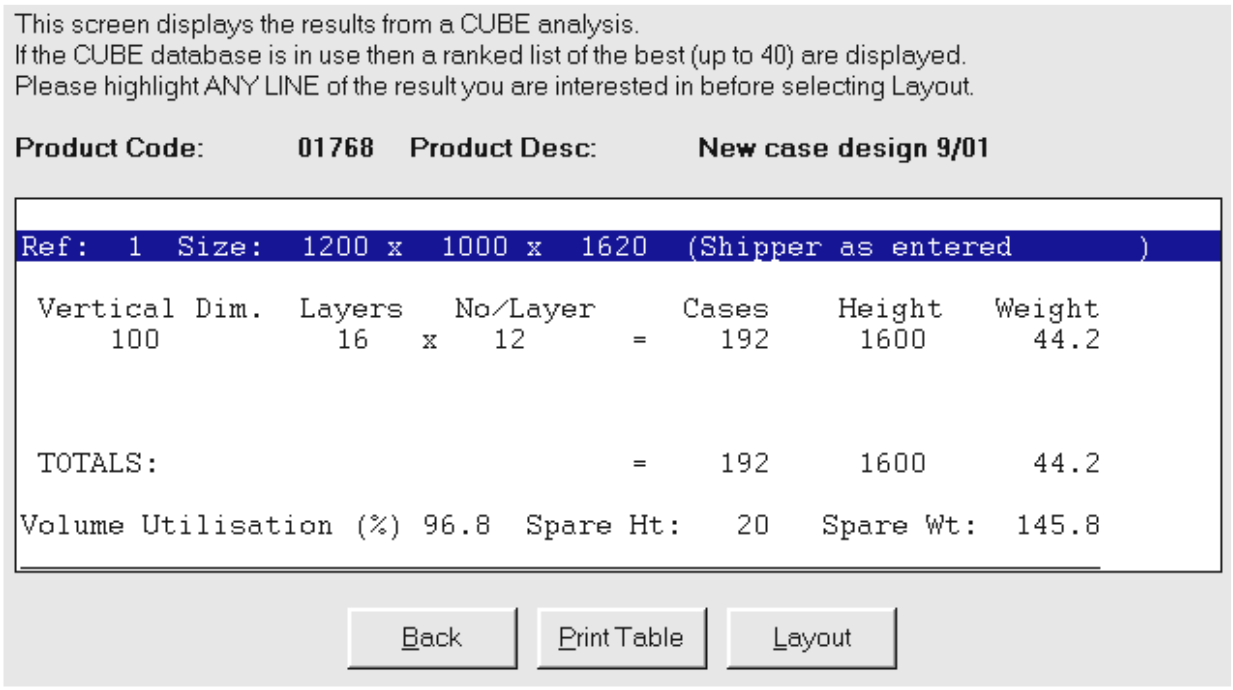
The *weight limit* (Kg) of the loaded unit (in the range 1 to 32000 Kg).

Two other tick-boxes **may** be available.

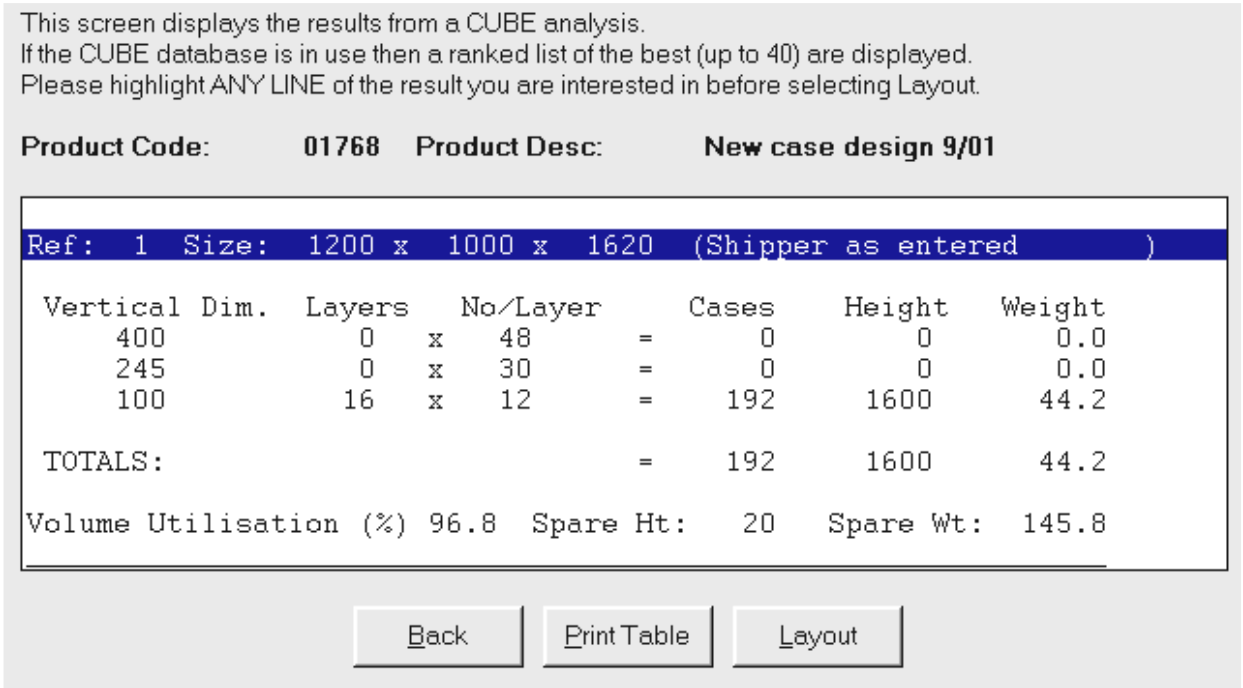
The first of these - **Cube Database** - will only be available if a database of shipper sizes has already been created. This is discussed later in this section.

The second - **Top Layer Orientation** - will be available whenever one of the case details entered on the previous screen has been stipulated ato be vertical. If you tick this box then solutions using the stipulated orientation vertical for all layers, except for the top layer if this is advantageous.

Selecting pack will tackle the given problem and present you with the solution. Problems with up to 500 items per layer can be tackled using this module. A typical results screen is shown below.

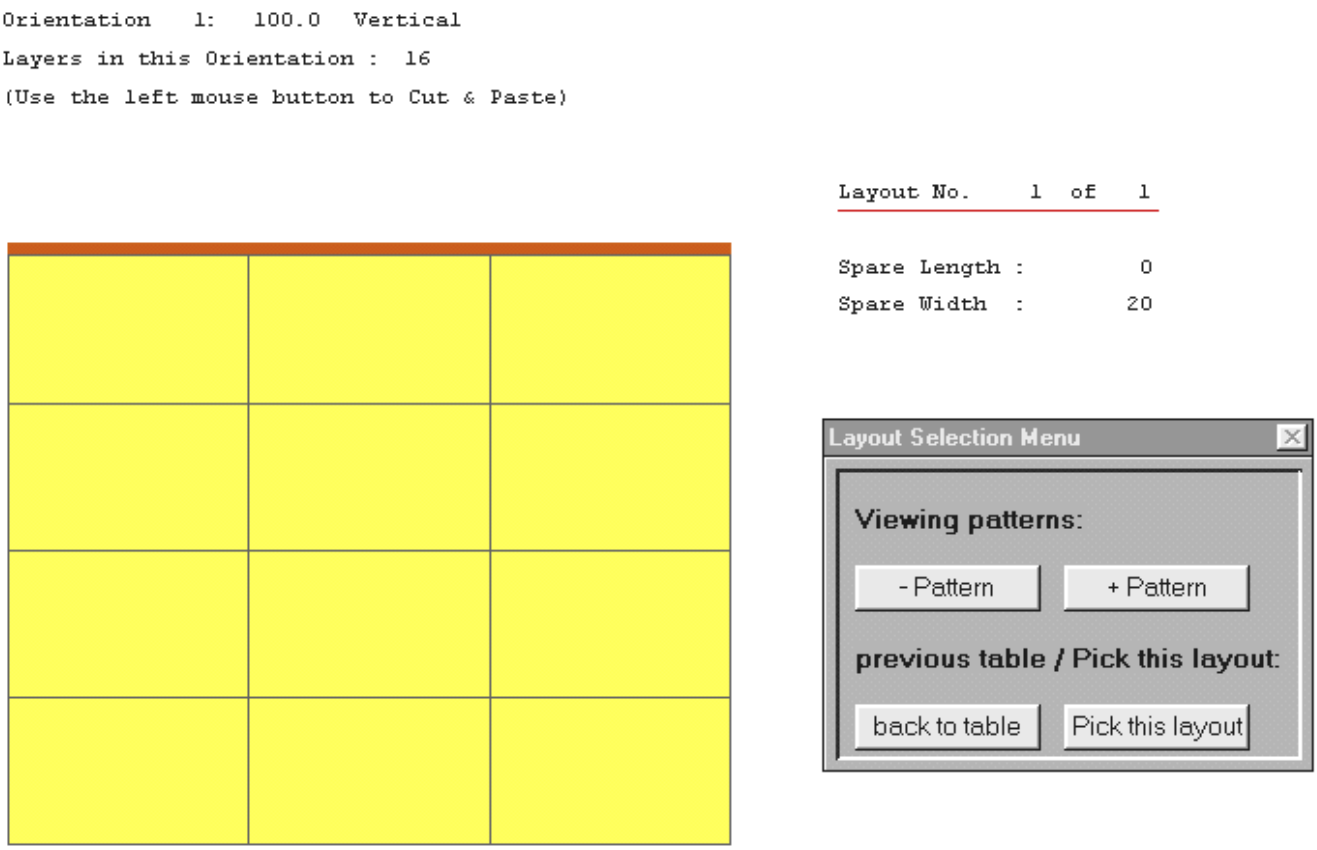


In the above instance we stipulated that the 100 dimension must be vertical in all layers. If this had not been the case then the following results would have been shown:



This confirms that even with re-orientation no improvement would have been possible.

Both of the above screens relate to the optimal packing of a single case size within a single shipper size. Thus there is only one solution and this will already be highlighted. We can select **Layout** to view the available layouts for this problem. Here the case size is large and a single simple layout is available to achieve the maximum packing.



In many instances there may be multiple optimal layouts available, and if any of the 3 orientations can be vertical then, as described at the start of this section, a number of layers using **each** of the 3 case orientations (or any 2) may provide the optimal solution. In such a solution you would need to pick layouts (from those available) for each of the orientations used.

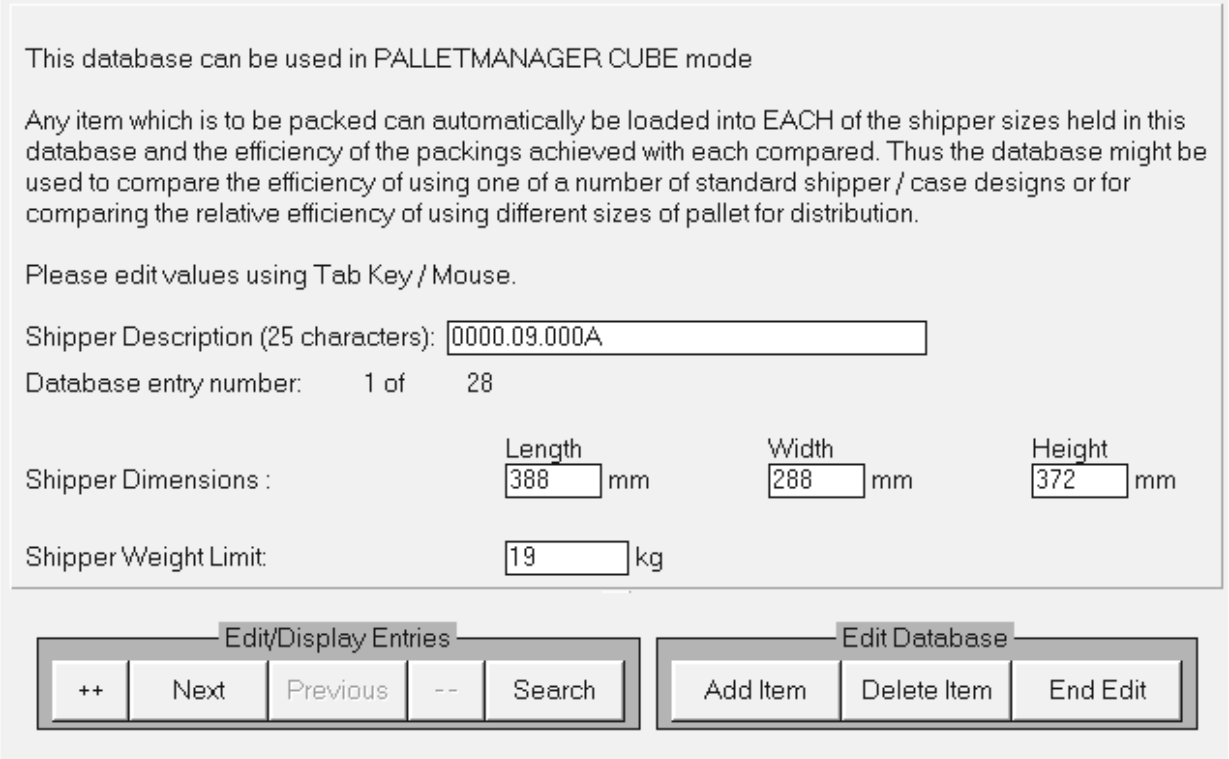
Having selected the layout(s) to use you are then presented with the standard View / Print selection screen (Screen 7). Here as usual additional notes may be added. In Cube mode a single report provides all the information needed on the packing solution selected. As with Palletise and Collation modes the **Store** module can save specifications for subsequent recall. The Save option will be amongst those available to you if this has been purchased by you.

8.3 The PALLETMANAGER Cube database.

The above discussion of the operation of Cube mode has assumed that a given case is to be packed into a shipper of stated dimensions. In some instances you might which to identify which of a current set of possible shippers (perhaps ones currently in use for other products) should be utilised. The **Cube Database** facility allows the case details entered on the Cube data input screens to be run not only against the single shipper size entered, but also against a database of other shipper sizes.

Database Creation.

The creation and modification of the Cube database is carried out by selecting **Cube Shipper Base** from the opening PALLETMANAGER menu. Having done so you are able to create a database with details of up to 500 (previously 200) standard shippers. A typical screen is shown below:



The database contains a description, **internal** dimensions and a weight limit. It might be used to hold standard distribution shipper sizes so that the one most appropriate to be used for a new product can be determined.

The options shown allow you to enter / modify / delete the descriptions and sizes of up to 500 standard shippers. These sizes and descriptions are held in a datafile in **sorted order** according to shipper description.

The Next and Previous buttons allow you to browse through the database. The ++ and -- perform a similar function initially but in a large database move more through the database several entries at a time. Entries can be added or deleted. Having completed changes **End Edit** will save the database updates (if any) to disk. If you need to abandon all changes a **Quit** option is available at the top left of the screen (as with all other PALLETMANAGER screens).

Earlier it was mentioned that when using Cube (as with other modules) a set of default shipper dimensions (Length, width, height and weight) are presented to the user. When a Cube database has been created these values will be those of the first (sorted) entry in the Cube database. By suitable coding of the entries (00000 etc) an appropriate default can be set up.

Whenever PALLETMANAGER is subsequently started the database created using the above procedure will be made available when operating in Cube mode. The use of the database is selected by you on Screen 3c where Cube Load Limits are defined.

If a run utilising the Cube database has been selected then the stated case will be run against <u>each</u> shipper in the Cube database.

The results then displayed (for all the shipper sizes) will be sorted **into order of volume utilisation** with that shipper giving highest utilisation being displayed first. As with the above results screens several lines are used to report the solution quality of each shipper. The display may be scrolled to view the results of the best 30 shipper sizes from those in the database and a printout may be requested. Highlighting (using the mouse) the entry of interest and then selecting Layout will, as above, produce the layouts available to create the desired solution. The Screen 3 default load limit values may be changes prior to calculating solutions using the database and all database entries together with the Screen 3 load limits will be examined as part of the analysis.

If a particular shipper size provides for an extreme number of product to be fitted (more than 500 / layer) then it will be excluded from the analysis.

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SECTION 9 -

THE STORE MODULE

(Covers: Introduction to report storage, Store facilities, Step by Step use, Security of files, Direct entry to Store)

9.1 Introduction.

Many users naturally wish to keep a computer based record of PALLETMANAGER solutions for subsequent recall. The STORE module provides an efficient and effective set of tools for the storage and retrieval of this information. It is also possible to use the **Webbase Module** to produce a set of specifications which can be viewed using a web browser. This is fully described in Section 14 of this manual.

There clearly are a number of ways in which computer based storage might be achieved without using the STORE module. For example this release allows any of the printer reports to be copied as a complete page to the Windows clipboard for saving in your chosen graphics format. Alternatively selected parts of any screen report could be copied to the clipboard and pasted into a company pro-forma document, perhaps using Microsoft Word..

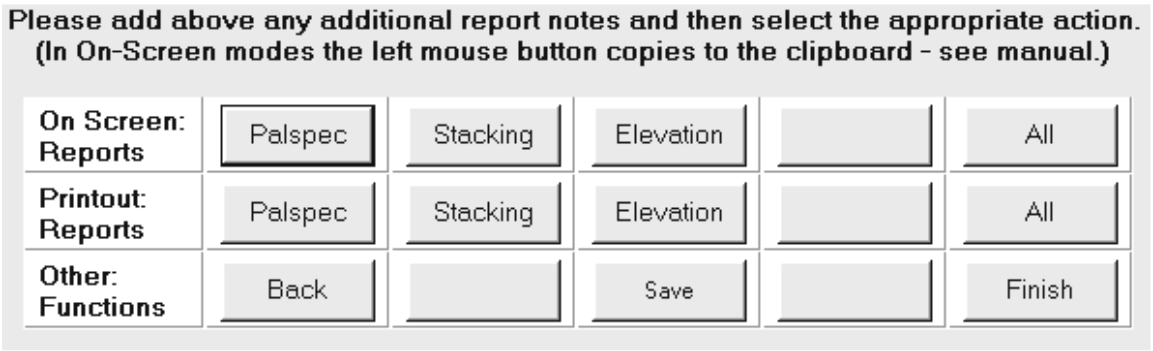
Whilst such techniques might suit your needs, both would require significant disk storage to hold the necessary graphics, especially when details of thousands of products need to be stored. Also, when specifications change (e.g. case material, pallet size etc), complete re-keying of data would be required in order to re-solve using PALLETMANAGER.

The STORE module allows you to save PALLETMANAGER specifications so that they may subsequently be retrieved for on-screen display and/or output to printer (in English, French or German languages). It also provides and automatic data link to PALLETMANAGER when you need perform a re-run of a previously solved problem in the light of product / packaging / pallet size changes.

The STORE process creates a compact numeric based database of each solution. The current release accommodates up to 5000 product entries. The display and printing actions from STORE can carried out on the same PC as originally used to solve the problem, or another (remote) PC using a 'stand-alone' STORE display configuration. A file with 5000 entries is unlikely to exceed 10Mb of disk space.

9.2 STORE Facilities.

In order to save details of a particular PALLETMANAGER solution for subsequent re-printing, or re-running, the **Save** option is selected from the bottom line buttons on same screen from which printing and screen view of reports is carried out (Screen 7).



The selection of **Save** will, in any PALLETMANAGER work session, save up to 20 specifications to a temporary file. When you then select to Exit from PALLETMANAGER the STORE module will automatically be loaded and these saved specifications will be merged with those already held in the Master Storfile. In Collation mode specifications involving a case make-up of up to 999 units can be stored. If a collation exceeds this (e.g. 1*1*2000) then you will need to utilise Webbase to save this specification.

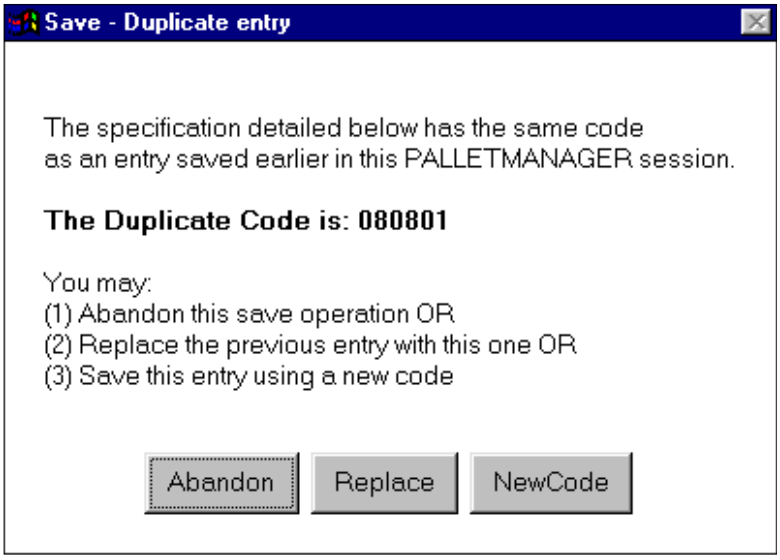
Those users with the Webbase module will find an additional row of (white) buttons available. This is described in Section 14 of this manual.

9.3 A Step by Step Guide.

When you have solved a problem using any of the PALLETMANAGER modules you will be presented with the above screen from which screen and printer reports can be selected. The Save option will be active if you have this module enabled. Selecting **Save** from this screen will capture to disk all information relating to the solution currently being examined. The message below will be shown.

(Note: all solution details including reports you may not have viewed / printed are automatically saved to disk.)

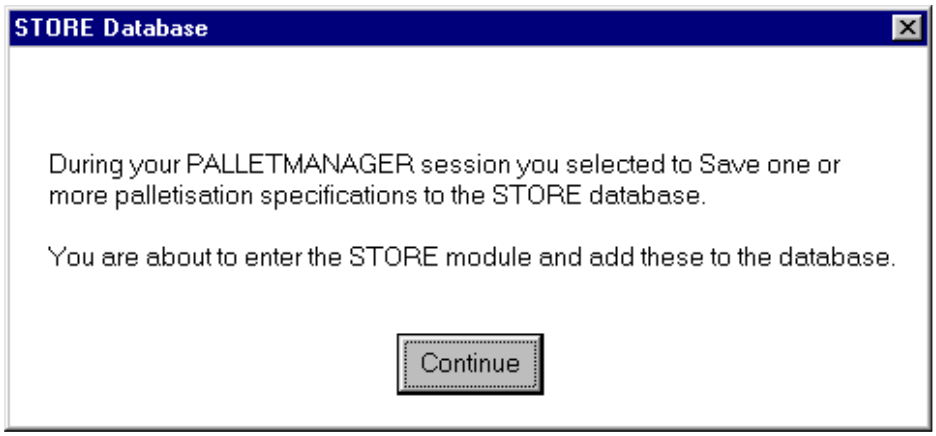
In this version up to 20 palletisation specifications can be saved in each PALLETMANAGER session. If you attempt to save a result which has an identical case code to another result saved during **the current** PALLETMANAGER session then the following screen is displayed.



The options available to you are clear from the screen presented above. Abandon will not save this latest record, NewCode will request another code for use with this entry.

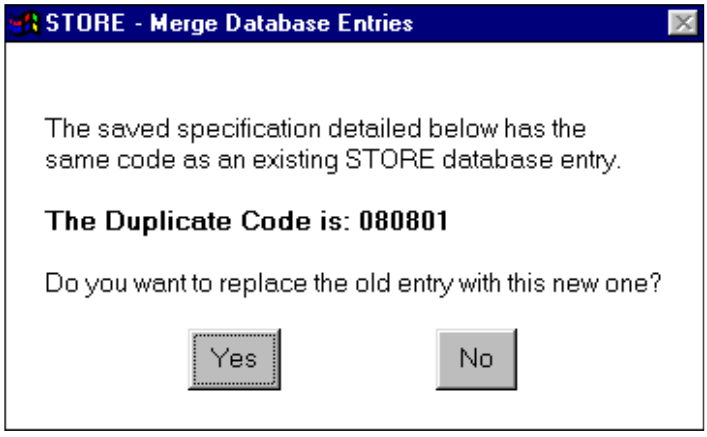
Master File Updating.

At the end of your PALLETMANAGER session, when you select to **Exit** from the software, the fact that you have saved specification(s) will be detected and the STORE module will be entered. You will be alerted to this as shown below:



Following the above screen the results saved in the session will be merged with existing specifications saved previously so as to form a Master Storfile.

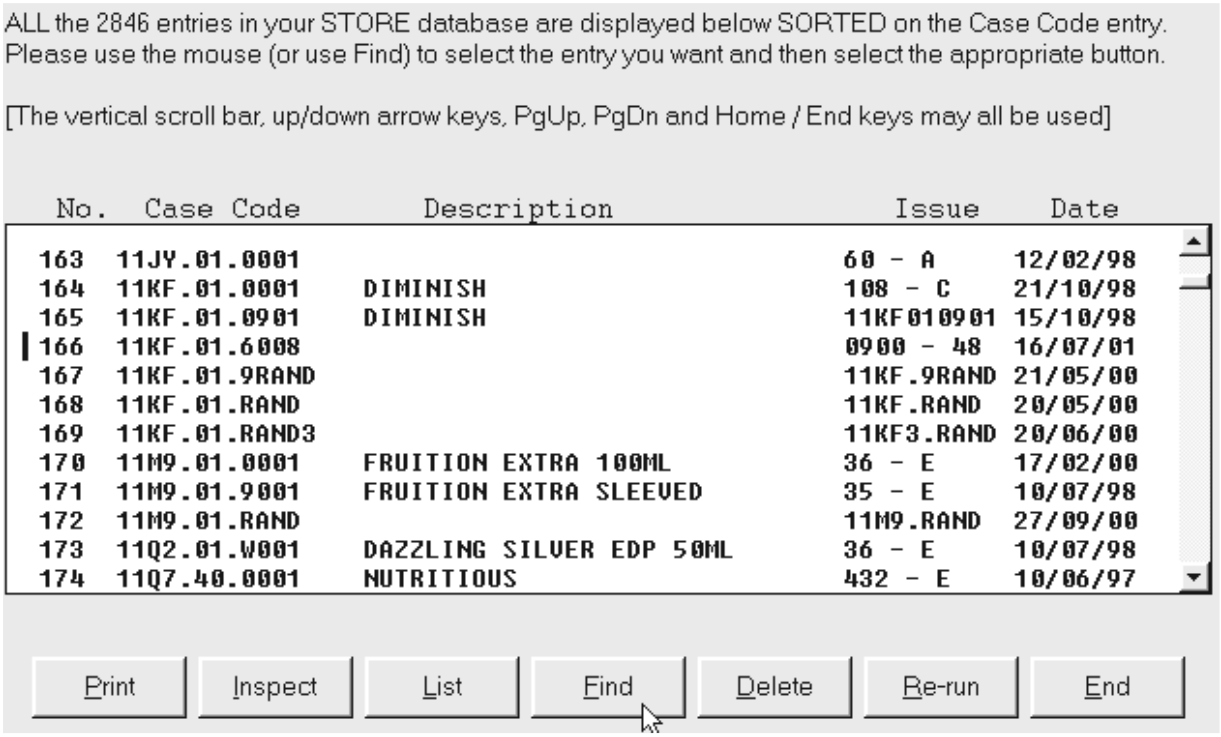
If, whilst merging saved records to those already on file a duplicate product code is detected within the database (as shown earlier any duplicates within an operating session are detected before they are Saved), then the following screen will be displayed.



You may wish to replace the old entry with the updated one. However if you choose not to replace the old entry with the new one an alternate code for the new entry can then be input.

When update of the database is complete the main STORE database screen (Screen 9) will be displayed. All the entries in the database (up to 5000) are displayed in sorted order (of case code) in a scrollable window.

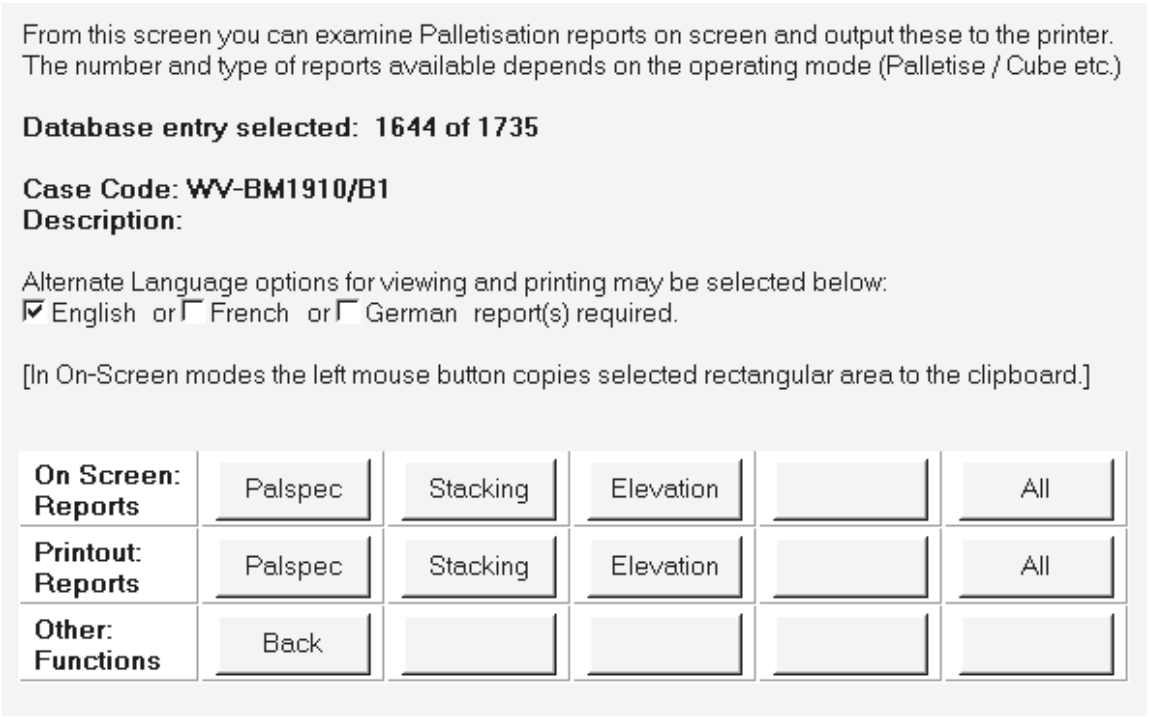
As described on the screen mouse and keyboard keys can be used to move though the database and the left mouse button can be used to highlight any particular entry. **Before selecting most of the buttons on this screen you should highlight an entry which you wish to examine further.**



As suggested from the labels on the buttons the functions available from this screen are:

- Print report(s) for a particular product (for the currently highlighted entry).
- Inspect on-screen the product specification held in the STORE database (for the currently highlighted entry).
- Produce a file containing tabular details of all reports which are held (in a format which could be imported into a spreadsheet).
- Find a particular entry in the file. In this release the user provides a search string and all records matching that string are listed. Any of the entries can then be selected to Inspect / Print.
- Delete a redundant report (the entry highlighted).
- Select the re-run of a product on file (the entry highlighted).
- End the Store session.

The **Print and Inspect** buttons lead to the exactly same screen - shown below (Screen 9p - both buttons are included to be compatible with earlier releases). As described above these options are selected **after** using the mouse to highlight a particular entry in the database.



You will see that this screen is very similar to that used to print and view reports following a PALLETMANAGER run. Details of the database entry which was highlighted at the time when the button was selected are shown at the top of the screen. The language to be used for the screen / printer reports can be selected (English is always the default), and any or all of the reports can be viewed on screen or output to the printer. Once again there may be additional row of (white) buttons shown to provide for the Webbase Module. Once again this is described in Section 14 of this manual.

When viewing reports on screen two methods of **copying graphics to the Windows clipboard are available** (if required). Any rectangular region can copied by placing the mouse at the corner of the required rectangular region, depressing the left mouse button and then moving the mouse to enclose the region to be captured - then releasing the left mouse button. A screen message will be displayed. Alternatively the **whole of a report** (2 screen pages) can be copied to the clipboard by just pressing and releasing the **right** mouse button whilst viewing the report on screen..

The **List** button produces a file on disk containing summary details of the specifications held in the database. A file **storeout.prn** is produced in the installation folder. This file is suitable for importing into a spreadsheet if required. (It does not matter which database entry is highlighted when this button is selected).

The **Delete** button allows you to delete the **highlighted** entry. Naturally you are asked to confirm the deletion before it is executed.

The **Re-run** option provides a direct link to the PALLETMANAGER calculation modes.

Suppose you have a specification in the STORE database which was calculated some time ago. A re-examination of the solution in the light of some change is required (e.g. a change in packaging specification, a dimensional change etc). By highlighting the entry in the STORE module and selecting Re-run the dimensional details of the product, the pallet originally specified and the packaging material originally specified will be recalled. You will then automatically enter PALLETMANAGER with all these details already completed on-screen. You will simply need to make any changes required and re-solve.

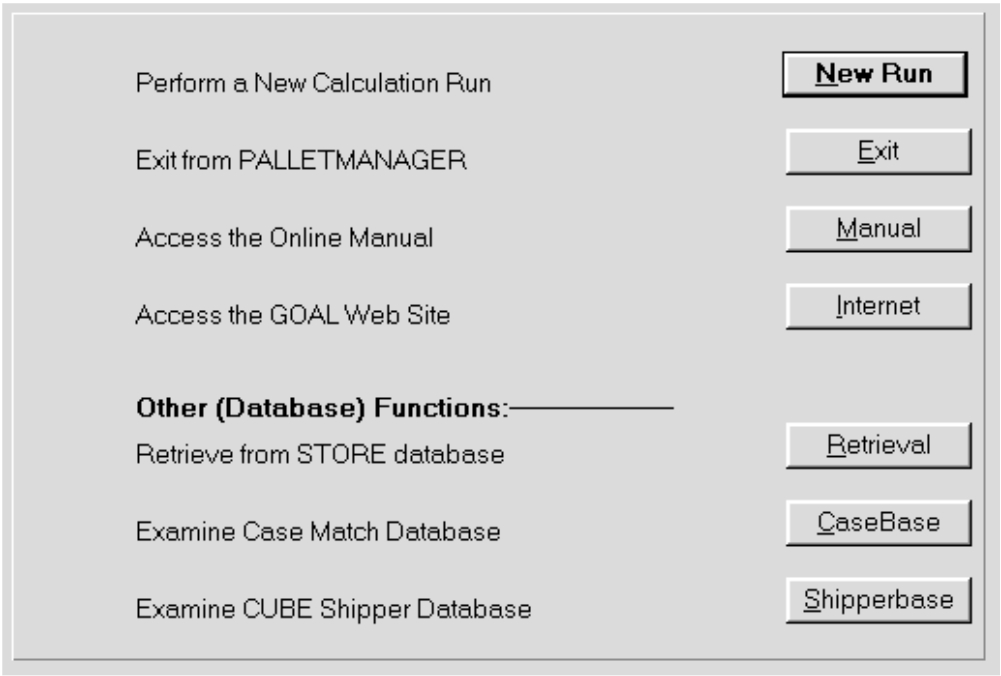
It is important to note that the pallet and the pack style details originally saved may be ones which no longer exist in your files of pallet and style details. The original values at the time of creation **will** be utilised and, in Collation / Tertiary mode, if Style is selected then the style for this re-run may be viewed. Normally only styles 1 to 28 are used in PALLETMANAGER runs. In the case of a re-run, Styles 29 (the Collation Style) and Style 30 (if applicable, the Tertiary Style) - both temporary Styles - may be viewed and edited.

9.4 Security Copies.

As with all other information stored it is important to maintain security copies of important information. In the case of the STORE module several files with the name STORFILE and having various extensions (e.g. .DAT) will be created either on the hard disk (in the PALLETMANAGER directory) or on floppy disk. Security copies of these should be made - please see Section 2.

9.5 Direct entry to the STORE module.

STORE can be used to list, browse, view, re-print and delete palletisation specifications without having first to save results in a PALLETMANAGER work session. This is achieved by selecting Retrieval from the opening PALLETMANAGER menu.



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SECTION 10 -

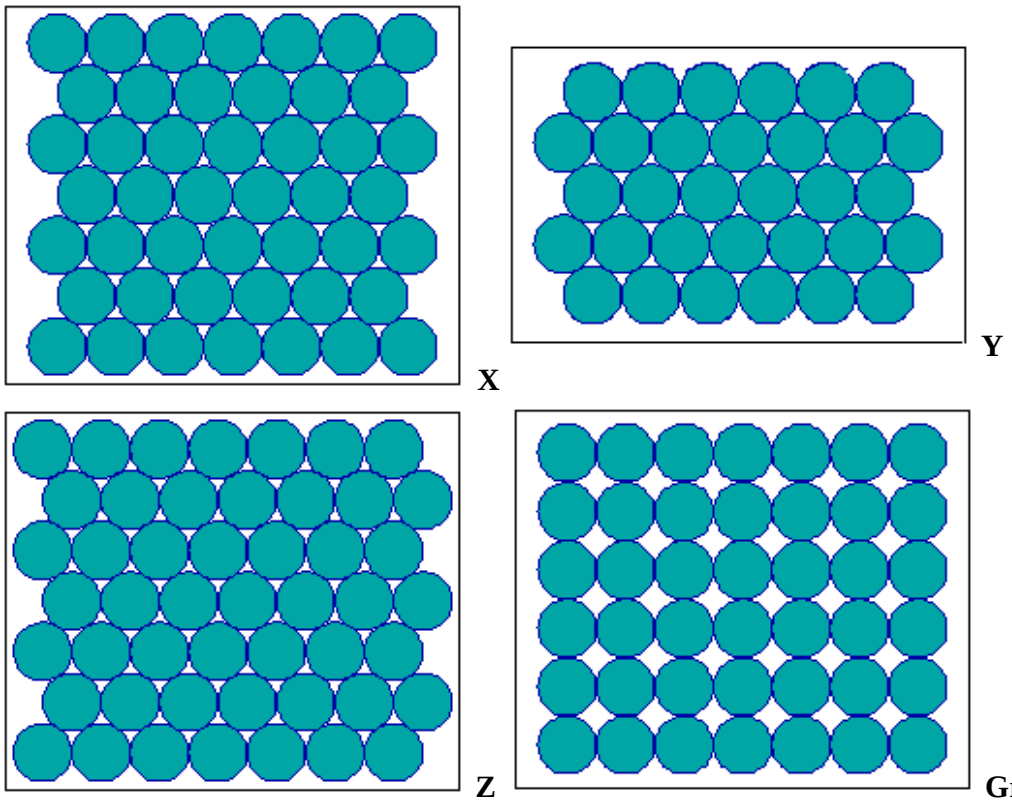
Cylindrical Packing

(Covers: Introduction to types of pattern, Data entry, Cylinder Palletise, Cylinder Collation, Cylindrical results, Case design allowances, Palletising flower pots)

10.1 Introduction.

This section deals with both the collation of cylindrical items to form a case which is then to be palletised (using either Collation or Tertiary modes), and with the direct palletisation of cylindrical items (using the Palletise mode). It also includes in Section 10.7 discussion of the palletisation of tapered cylinders (buckets / flower pots etc), where improved palletisation may be achieved by 'top and tailing' the items.

In all instances two distinct types of cylinder packing are examined. The simplest form is that in which cylinders MUST be arranged in such a way that adjacent units form strict rows and columns. We will call this a grid packing. A more powerful form is where cylinders can be grouped together to form more complex arrangements such as those shown below. We refer to this as nested arrangements. Solutions using both grid packing and any of the arrangements shown below (including ones rotated by 90 degrees) are produced by PALLETMANAGER. For any particular cylinder dimensions only a subset of arrangements will be appropriate. The three letters used to distinguish between these types of arrangement (X, Y and Z) have been chosen so as to help describe the precise form of nesting and are used as codes on tabular result pages.



In describing the cylindrical packing facilities in this section it is assumed that the reader is familiar with the use of the normal Palletise and Collation modules (i.e. for 'rectangular' items) as detailed earlier in the manual

10.2 Data Entry.

Dimensional and orientation data for cylindical items is entered into the same data entry screens as normally used for palletise / collation / tertiary data entry. In both palletise and collation modes the specification of the cylindrical nature of the item to be packed can be carried out in 2 places - either on Screen 3 (where pallet size / packing style is selected, or by selecting the **Advanced** Options screen (Screen 4) from Screen 3. In Tertiary mode a check box for cylindrical items forms part of the standard initial data entry screen for this mode.

10.3 Cylindrical Solutions in Palletise Mode.

If a cylinder is involved then the grid solution together with any nested solutions which provide as large a number of packed cylinders, or more, will be reported. In **all instances** the cylinder will be placed upright on the pallet regardless of whether the height dimension has been specified as being vertical.

Once packings have been calculated then the normal Results Summary screen (Screen 5) will be displayed. This is similar to that presented in normal palletisation mode but it may (if applicable) have one extra item of information. When a nested pattern is being utilised then, following the reference number will be a letter (X, Y or Z). This code describes the type of nesting pattern used. If no code is given then a grid pattern is in use. Even when nested patterns have been stated as being acceptable, these will **only be calculated** if they provide at least as good a solution as that obtained using a grid pattern. A typical display from the Results Summary Screen is shown below.

Ref No	Extnl Case Dimensions	Colln	Matl	PALLET Cases	Layer	% Fill Area	Vol	+Layer Ht.	Wt.	Cost Total
1Z	155 155 400	N/A	N/A	196	4x 49	77	76	380		0.153
2X	155 155 400	N/A	N/A	184	4x 46	72	71	380		0.163
3X	155 155 400	N/A	N/A	176	4x 44	69	68	380		0.170
4	155 155 400	N/A	N/A	168	4x 42	66	65	380		0.179

As in normal Palletise mode you can select a particular result and view on screen the pallet layout.

A palletisation specification, similar to that obtained in other modes may be printed and the solution may also be **Stored** for later re-print / re-run. It should also be noted that in Palletise Cylinder mode, whether or not a nested pattern is specified as being acceptable, the value for inter-case gap **is set automatically equal to zero**. In practice any such spacing (which might take the form of a protective sleeve), can be allowed for by increasing the cylinder diameter.

10.4 Cylindrical Solutions in Collation and Tertiary Modes.

In both Collation and TERTIARY modes data input for cylindrical problems is carried out on the standard input screens, with the cylinder height being input as one of the three primary (or sub-primary) dimensions and the cylinder diameter being entered as the other two dimensions.

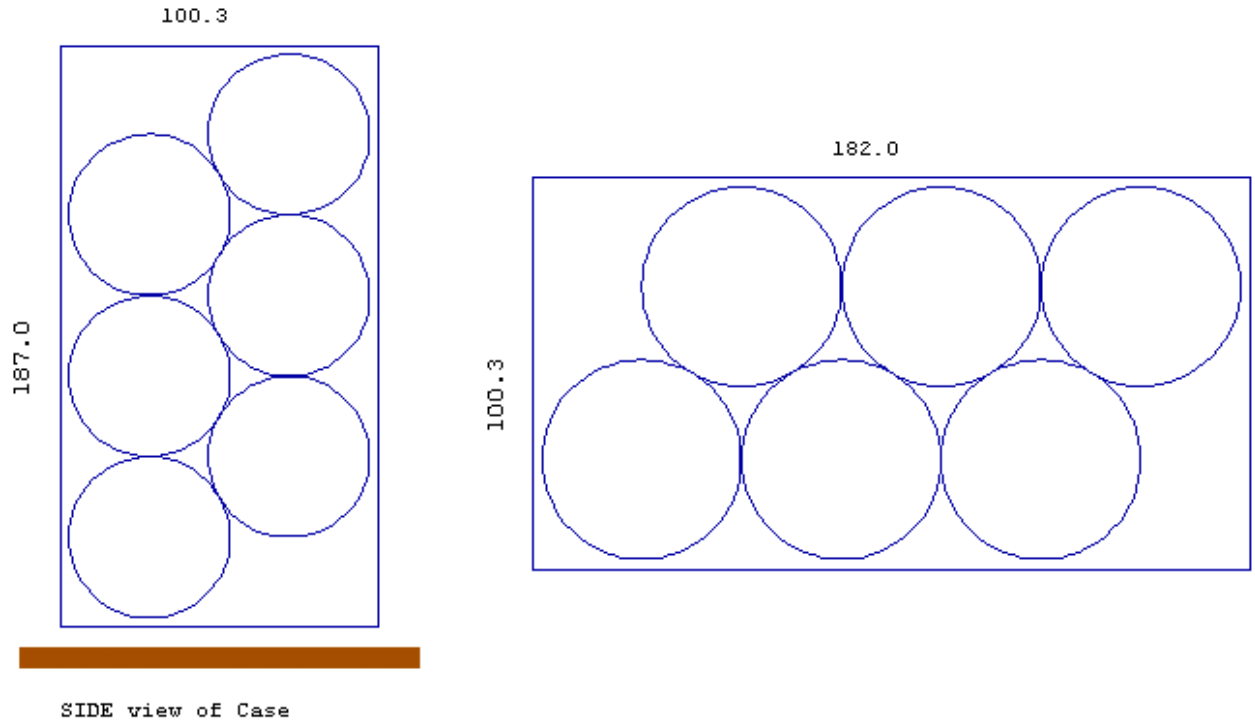
As usual one of the dimensions can be stipulated as being vertical. If no vertical dimension is specified then packings examined may have the cylinder placed either horizontally or vertically in the collation. If one of the cylinder diameter dimensions is set to be vertical then the cylinder height dimension will always form one of the two base dimensions. In **Tertiary** mode a check box on the initial data entry screen allows you to specify that details of a cylindrical item have been entered. In **Collation** mode the cylindrical nature of the

item is specified on the **Advanced** Options screen (Screen 4) selected from Screen 3 (Pallet & Style Selection).

In **Collation** mode with larger collation quantities (12/24 etc) there will typically be a large number of different case sizes produced, many of which will involve the use of nested patterns. When **Alternate Collation quantities** are also specified then a very large number of possible solutions would be produced, and **PALLETMANAGER** would only display the 'best' 99. For this reason, whenever Cylinder Collation / Alternate Collation is selected, **the type of patterns examined will ONLY include those based on grid patterns**. If you wish to compare collation quantities using nested patterns then each collation quantity should be investigate separately.

10.5 Cylindrical Results.

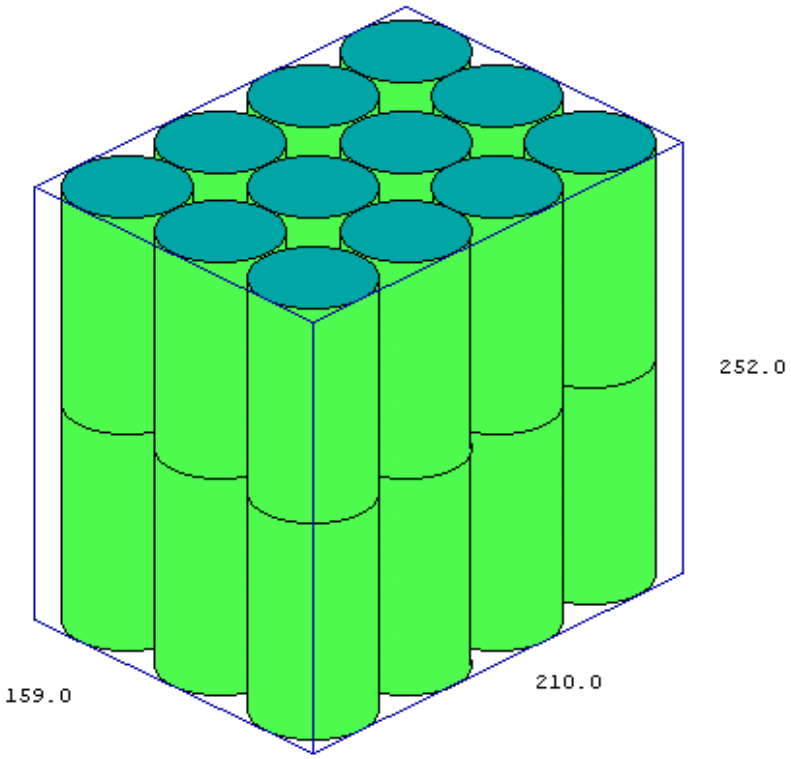
The results screen (Screen 5) displayed in Cylinder mode is similar to that presented in normal collation mode but includes additional items of information relating to nested patterns. Following the reference number there is generally a letter (X, Y or Z). This code describes the type of nesting pattern used. If no code is given a 'grid' pattern has been used. In tertiary mode lower case letters (x, y and z) are used to indicate the same information. The printout obtainable from this screen also contains these codes and contains additional information to assist in solution selection.



You can also select the **Collation** button on this screen to display how details of how the cylinders are combined to form the case. Two such examples are shown above.

In the left hand example the cylinders are placed horizontally in the case to form a nested unit. The dark (brown on screen) thick horizontal line represents the pallet base when the case is loaded. The right hand example has no such 'thick line' and thus represents a top view of the case. Thus in this diagram the cylinders are placed vertically on the pallet.

If a grid pattern is used then the screen (and printer) display will present the cylinder in full 3D form rather than the side views used in nested arrangements. A typical 3D view is shown below.



When nested patterns are used then for clarity the side / top views of the arrangement are presented to the user (rather than the 3D picture above) so as to make the arrangement clearer to view.

10.6 Case Design Allowances.

When considering nested cylindrical packings the effect of the allowances entered on the pack style screen are **somewhat different** to those normally applied for rectangular cases.

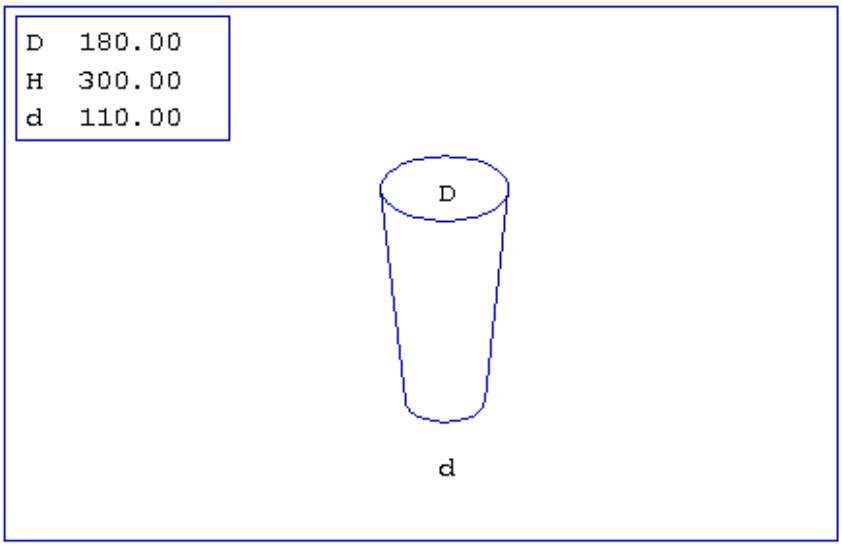
1. Whenever a cylindrical item is specified, whether or not a nested pattern is specified as being acceptable, provision is made for all material and spacing allowances **except** for the gaps between each Primary. These are set equal to ZERO regardless of entries on the pack style screen. The gap constants and all other allowances are applied. If inter-primary gaps were allowed then the nesting arrangement would be made invalid. In practice any such spacing (which might take the form of a protective sleeve), can be allowed for by increasing the cylinder diameter.

2. All 'nested' patterns are restricted to designs where the number of layers used falls within the range set on the Pack Style screen **but only** in respect of nestings in which the cylinder height is vertical within the case. The lack of clear 'layers' in other orientations make the application of this constraint for other arrangements unsuitable.

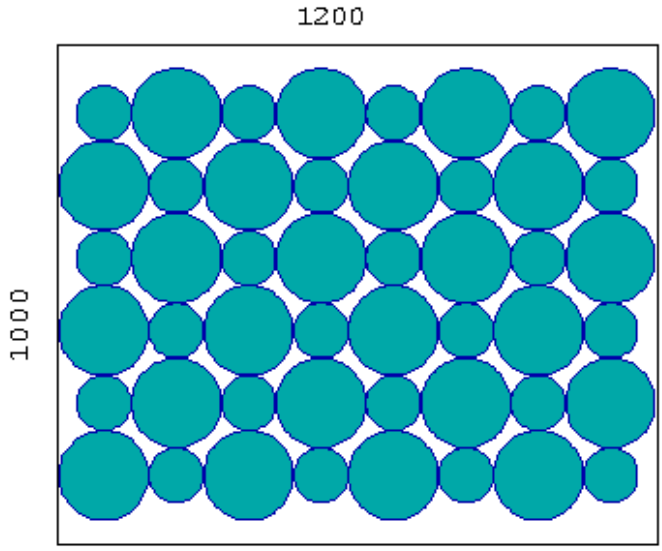
With nested arrangements additions for headspace are always added to the height of the case, and where layer pads are specified the thickness of these is always added to the case dimension (height or otherwise) which is 'made up' of cylinder heights.

10.7 Palletising 'Bucket / Flowerpot' designs.

In Palletise mode the Advanced Options screen (Screen 4) allows you to select that the items being packed are not either cylinders or cuboid objects but of a bucket or flower pot form. Normally you can simply treat these as simply cylinders in the normal manner. However, if the 'buckets / flower pots' can be packed 'head to tail' - in which the tapering cylindrical shapes (buckets) are alternated - upright and then inverted - so as to potentially pack more on a pallet, then this option on the advanced input options screen may be selected.



When selected (see further information below) the packing is carried out using top and tail arrangements of shapes such as that above, producing load plans (plan view of the pallet) such as that below:



At first sight it might appear as if this packing involved 2 different circle sizes, but if one considers the diagram carefully as a plan view from above, then the larger circles might represent placements of the 'flower pot' in its 'normal' orientation (with larger diameters uppermost), and the smaller circles pots inverted (with their smaller base dimension uppermost).

This option will only be available (un-greyed) if:

(a) you select Palletise mode and input all 3 of the input product dimensions as different values - these giving details of the larger diameter of the 'flower pot', the smaller diameter of the 'flower pot' and the height of the 'flower pot'. If (say) the height is in reality exactly the same as the larger diameter then adjust one or other so that it differs sightly.

(b) the height value has been ticked as being the height.

The diagrams produced will make maximum utilisation of the pallet by packing in the above manner. This will always be at least as good as the packings achieved using strict cylinder formations and will usually be better.

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SECTION 11

Top Layer Option and

Alternate Stacking Arrangements.

(Covers: Introduction to options, Top layer option, Mixed stacking modes.)

11.1 Introduction.

When developing the three dimensional pallet stacking arrangements in Palletise and Collation, we have so far made 2 assumptions:

a. That each pallet layer should consist of the same number of cases, placed such that the same dimension is vertical on all layers.

b. The arrangement used on each layer of the pallet is essentially the same, save for the possibility that alternate layers could be a rotation or reflection of the base layer.

This section examines how each of these assumptions may be relaxed, so as to potentially obtain improvements in both the number of cases packed per pallet, and the stability of the stacking arrangements.

11.2 The Top-Layer Option.

In Palletise and Collation modes (and as we shall see in Section 12 in Tertiary mode), the number of layers fitted (each layer being of identical height) will be restricted by the limits placed by you on pallet loading height and/or pallet loading weight.

An examination of the Results Summary Screen (Screen 5) may show that a small increase in one or both of these limits can allow an extra layer to be fitted, and the AddLayer feature may be used to examine the effect of such a relaxation.

However, there may well be situations in which, for example, the height constraint may not be relaxed, for example when pallet racking height provides a constraint. In such situations it may be acceptable to consider placing a *single layer of cases on their side* to form a top layer on the pallet stack, without changing the height and weight constraints applied.

PALLETMANAGER allows you to investigate the effect of utilising a single top layer of cases placed on their side. This is achieved by selecting the appropriate 'tick box' on the Advanced Options screen (Screen 4), selected from the Screen 3 where Pallet and Style details are set.

The operation of the Toplay feature can best be illustrated by an example.

In the Guided Tour (Section 3) a Collation example was studied in which 12 primaries each 65 * 55 *52 were collated for form a case. The results screen obtained in that Section is shown below:

Load Space available: 1200 * 1000 * 1620 ht.
Buttons such as Layout will calculate and display results for the highlighed entry.
Please highlight any line of the result you are interested in and then select the appropriate button.

Ref No	Extnl Case Dimensions	Colln	CASE Matl	Wt.	TOTAL Cases	Layer	% Fill Area	Vol	+Layer Ht.	Wt.	Cost Total
1	138 118 168	2x2x3	.15	1.4	639	9x 71	96	89	60	14	15.677
(Colln. Qty: 12; Pri/Pallet: 7668)											
2	230 72 168	4x1x3	.14	1.4	621	9x 69	95	88	60		15.703
(Colln. Qty: 12; Pri/Pallet: 7452)											
3	204 118 116	3x2x2	.15	1.4	624	13x 48	96	89	4		16.110
(Colln. Qty: 12; Pri/Pallet: 7488)											
4	270 62 168	4x1x3	.15	1.4	630	9x 70	97	91	60	2	16.216
(Colln. Qty: 12; Pri/Pallet: 7560)											

Whilst it was shown that some improvements could be obtained if the height and/or weight constraints were relaxed an alternative route to an improved solution is possible.

Assuming the height and weights constraints were **fixed**, then **if** it were acceptable for the pallet stack to have a **single top layer in another orientation**, then this might provide a further improvement.

In order to allow this to be investigated the **Advanced Options** screen (Screen 4) should be selected from Screen 3 where Pallet and Style details are selected. A tick box on this screen allows top layer rotation to be examined.

If the same problem as discussed in Section 3 is examined in this way then the following results screen will be displayed:

Ref No	Extnl Case Dimensions	Colln	Matl	PALLET Cases	Layer	% Fill Area	Vol	+Layer Ht.	Wt.	Cost Total
1	230 72 168	4x1x3	0.14	650	9x 69	95	93	132	26	15.487
	230 168 72				1x 29					
2	230 72 168	4x1x3	0.14	649	8x 69	95	92	122	25	15.494
	168 72 230				1x 97					
3	138 118 168	2x2x3	0.15	639	9x 71	96	89	60	14	15.677
4	230 72 168	4x1x3	0.14	621	9x 69	95	88	60		15.703

If we compare the above 2 screens we can see that the previous 'best' solution is now in 3rd place and there are two arrangements using a single top layer in an alternate orientation which give lower cost solutions - without the need to break / relax height or weight constraints.

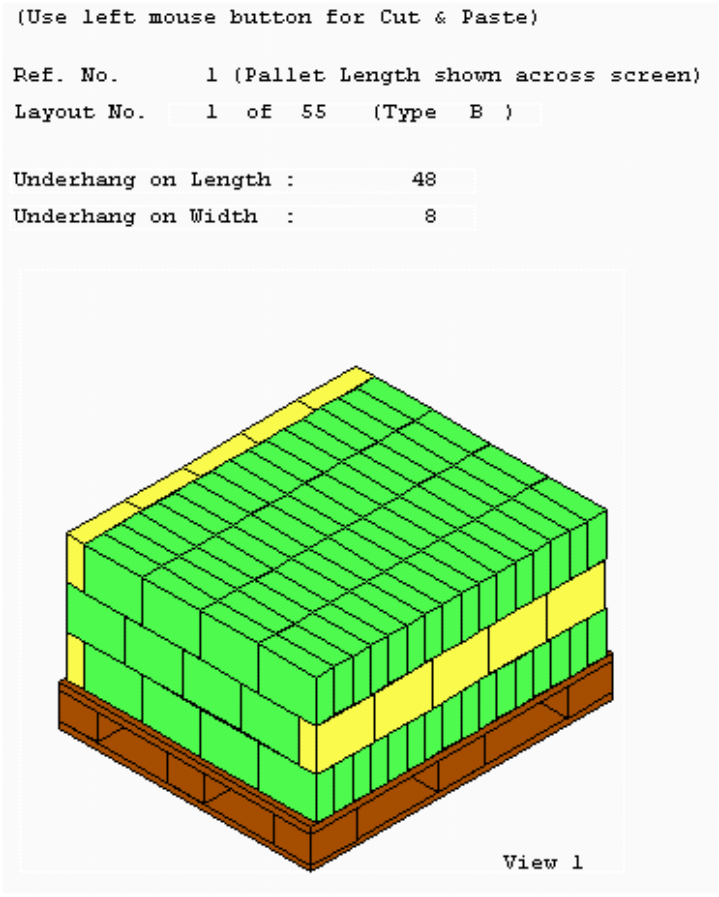
It should be stressed that the case dimensions of the base layers and of the top layer are the same, and the top layer simply represents identical cases placed on their side.

In the usual way a particular case reference may now be selected, and the pallet patterns displayed.

If however a solution is selected which utilises a Top Layer in a different orientation from the rest of the stack (In this instance we will select case reference 1), then we will need to choose not only the arrangement to be used to form the base layers of the pallet stack, but also the arrangement which should be used for the

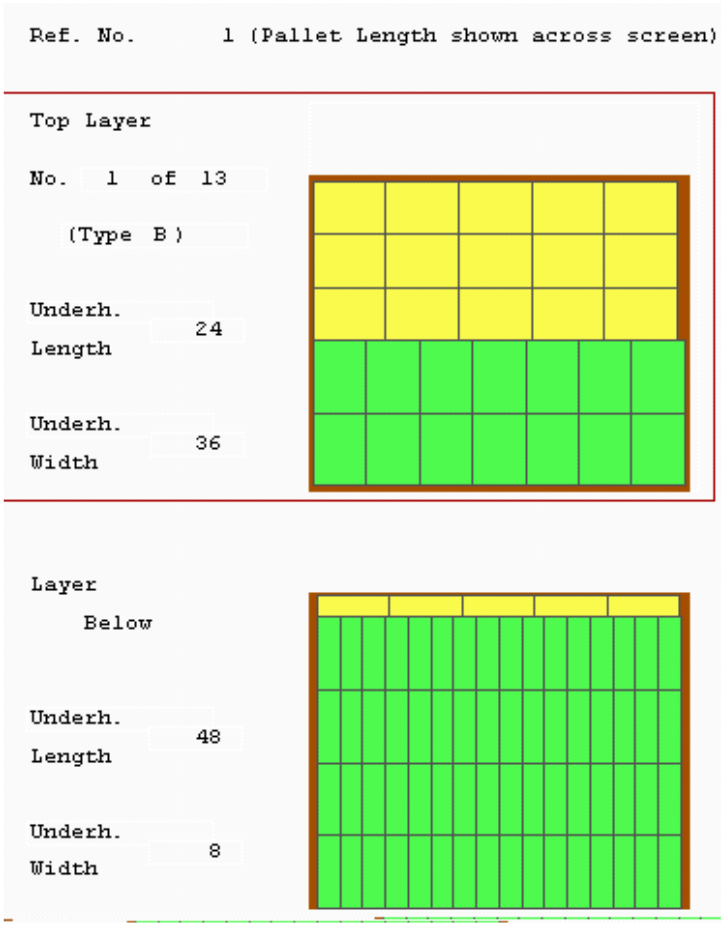
top layer. This will help us to ensure that the top layer is suitably supported by the layers below.

After selecting a stacking arrangement for the base layers in the usual manner, you will find that you are unable to select Print.



Instead you will need to select Pick toplayer to pick your chosen top layer.

At the bottom of the screen the base arrangement layer lying directly below the top pallet layer is displayed.



At the top of the screen, displayed in a 'window' is the first possible arrangement which may be used for the top layer. The possible top layer arrangement(s) may be examined or manipulated using the usual options buttons.

Having on-screen both the top layer arrangement, and that of the layer immediately below, enables you to choose a top layer arrangement which is appropriately supported. Once the desired top layer is displayed the selection of Print will allow you to select the reports which are to be printed.

11.3 The Mixed Stacking Mode.

When using Palletise, Collation and Tertiarymodes, whether or not Top Layer mode is in use, the stability of the pallet load will depend on the degree of support and interlock between layers on the pallet.

PALLETMANAGER has been significantly enhanced in recent releases to include a far greater range of optimal pattern types, and to allow for the re-arrangement of patterns (using move and space options) so as to form a stable stack.

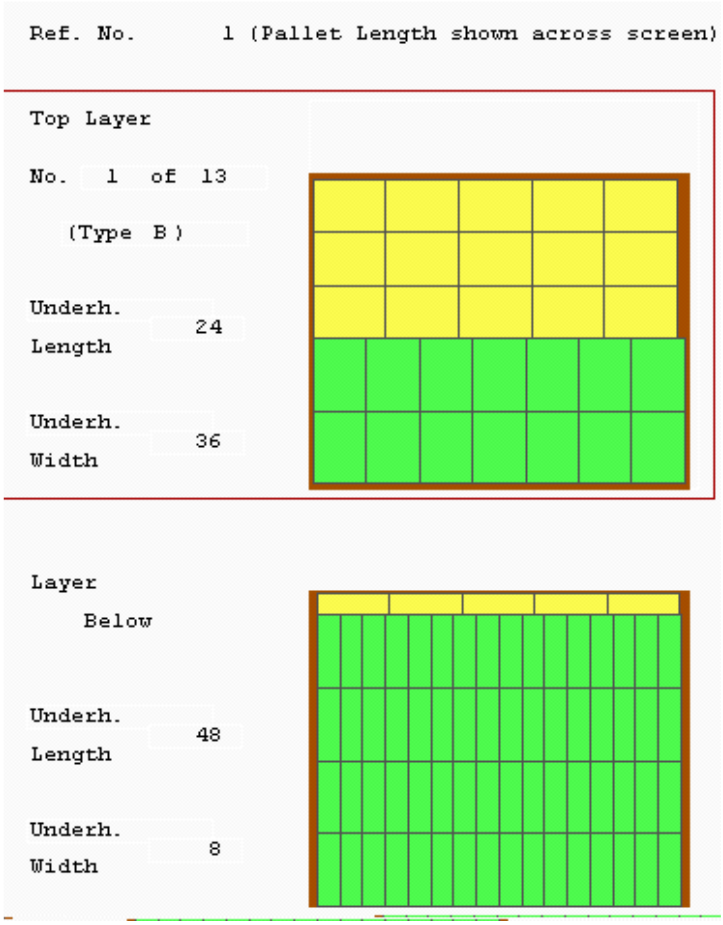
However, there will still occasionally be situations when the reflection / rotation of the pallet pattern does not fully satisfy the user in respect of stability and interlock between layers.

You may select a mixed mode of pallet stack generation in which alternate pallet layers are not simply transformations of the basic arrangement.

This mode may be selected by selecting for **Alter Mode**, one of the buttons on Screen 6 - Layout Selection.

When this mode is selected a screen such as that shown below is displayed. The lower part of the screen shows the first possible arrangement for the first layer of the stack (and layers 3, 5, 7 etc). Above this is the arrangement for the second layer of the stack (and for layers 4, 6 etc).

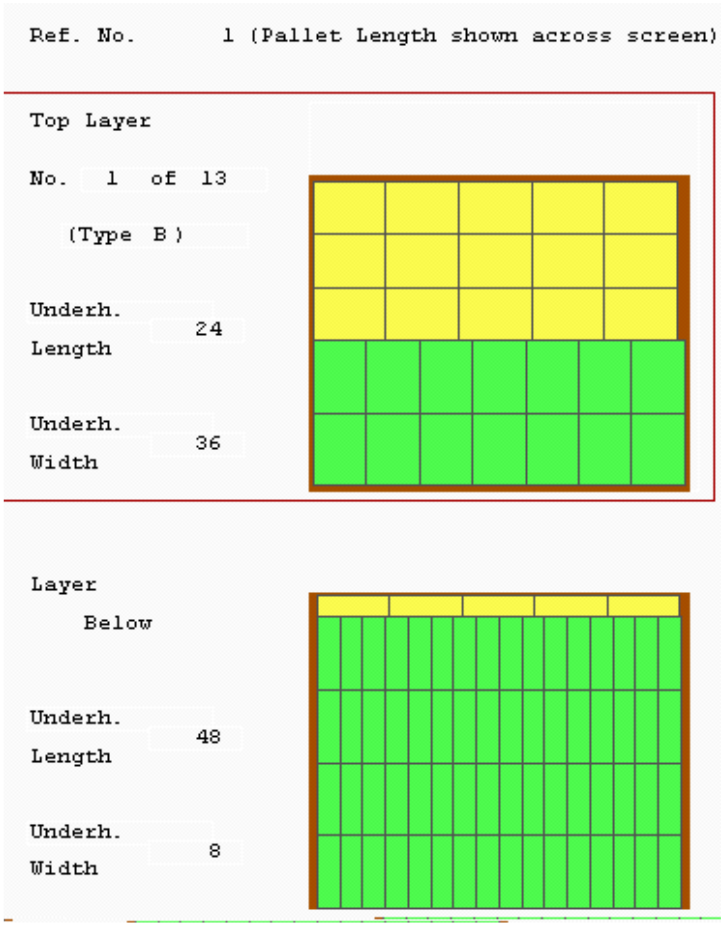
When you first select Alter Mode both arrangements will be identical, and the bottom pattern will be displayed in a 'window' - a containing rectangle.



This window is used to indicate to which arrangement the commands issued by the user will be applied. The **Swap** option may be invoked to change the window (i.e. to allow you to modify the other arrangement).

The usual movement and spacing options are available for adjustment of both arrangements, but the 2 and 3 dimensional screen views of the pallet stack can only be selected when the window is set for the base arrangement.

The Identical, Mirror, Flip and Rotation options are always applied to the arrangement in the top half of the screen only. Thus, if the bottom layer is 'windowed' and one of these commands is issued, then a stack is formed from the pattern shown at the bottom of the screen, and the appropriate rotation / reflection (as selected) of the pattern shown at the top of the screen.



Selection of **Print** then will initiate a print of the chosen arrangement, or, if the arrangement makes use of the Toplay feature you will first need to **Pick toplayer** before selecting Print.

At any stage Alter Mode may be selected to return you to the 'normal' single arrangement mode.

Therefore Mixed Stacking Mode enables you to combine together different pallet layouts. Those available for selection will always be for the same case size, with the same vertical orientation, and the same number per layer.

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SECTION 12

The Tertiary Module

(Covers: Introduction to Tertiary mode, Tertiary operation, Tertiary solutions)

12.1 Introduction.

This module allows you to investigate situations in which a two stage collation is required.

Before describing the operation of the module in detail it may be useful to once again recall the definitions given earlier for certain terms as used throughout this manual.

The term **case** is used to denote the final units which is arranged on the pallet. This might be a cardboard case or a shrink-wrapped unit. In Palletise mode the size of the case is specified by the user, in Collation mode the case size is calculated by PALLETMANAGER after considering the **primary** size, the number of primaries to be collated together, and the type of pack being utilised. Thus the term **primary** is used to denote the units collated together to form a case.

A further term, **sub-primary** will now be used to denote a unit which is collated together to form a primary unit, which itself is later collated to form a case.

This terminology has been adopted so as to avoid confusion which might result if terms such as sales unit, distribution unit etc were used.

12.2 Tertiary Operation.

This mode of operation is selected from the main PALLETMANAGER operating mode menu (Screen 1).

The first data entry screen is very similar to that used in other operating modes (Screen 2t1). Details of the dimensions of the sub-primary, the weight of each sub-primary, and the number to be collated together. You also have the opportunity to select on this screen, if appropriate, that this sub-primary is cylindrical. (If you select the cylindrical tick box and the item does not have at least 2 equal dimensions then the tick box will be ignored)

The sub-primary units defined here will be collated together to form a primary unit using, by default, a **Style 28** pack type (set up in the database as a shrink wrap pack). This is similar to the operation in Collation mode where a Style 1 pack type is used by default.

You may accept the default style 28 details, or by selecting the **Style** Database you may change these default values or define another style to be used.

In collating the sub-primaries to form a primary unit the style constraints relating to stability, maximum size, conveyor etc will be applied in the usual manner and primary units which fail to meet these constraints will be eliminated from further consideration.

Once data entry is complete and **Continue** is selected, collations of the defined sub-primary are formed and those which meet the constraints defined within the selected style are saved as acceptable primary sizes to disk.

Having completed this operation **the second data entry screen** (Screen 2t2) requests details regarding the number of **primaries** per case, and the annual **case** volume.

Most of the other information on this screen cannot be edited and relates to the data entered on the sub-primary screen.

Also on this screen you may select whether the primary unit must be placed upright in the case. An orientation constraint may or may not have been specified for the sub-primary when collated. Irrespective of this an orientation constraint may be specified for the primary units. By default the vertical orientation of the primary is retained.

Having selected **Continue** the **third data entry screen** (Screen 3 - identical to that faced in Collation mode) presents you with details of the default pallet details and the Style to be used in collating primaries to form a 'case'.

As in Collation Mode you may then select the **Style** Database or **Pallet** Database to change these, or can edit the load area details temporarily of Screen 3. You may also select **Advanced Options** and specify alternate collation quantities (as with Collation), and also select Top Layer mode.

12.3 Tertiary Solutions.

The Results Summary Screen (Screen 5) displayed will look similar to that normally displayed in Collation mode. Where nested cylinder solutions are used for the sub-primary collation lower case x, y, or z codes indicate the type nesting used (see Section 10).

Selection of a particular result (by highlighting it using the left mouse button as in other operating modes) will enable you to select **Collation** and examine the collation, not only of primaries to form the case, but also of sub-primaries to form the primary unit.

You should note that all displays and reports refer to the height of an item (primary / case), the dimension which forms the height is as per the Style definition. This may not be the height in the case or on the pallet.

Having selected a reference number then select **Layout** to determine possible pallet arrangements.

Once again the screen display is similar to that used in other modes and pallet arrangements can be generated in the usual manner.

When Print is selected, the reports produced not only detail the collation of the primaries to form the case, and the palletisation of the same, but also detail the arrangement of sub-primaries within the primary.

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SECTION 13.

Case Rationalisation and System Utilities.

(Covers: Case rationalisation, Case database creation, Case database use, Other rationalisation issues, Store database and Intranet use)

This section of the manual deals with a number of other features which do not neatly fit elsewhere into the manual.

13.1 Case Rationalisation.

The rationalisation of case and shipper designs is of increasing importance in many companies, both from the viewpoint of cost reduction and in the light of new re-cycling regulations.

Earlier, in Section 8, one possible route towards rationalisation was introduced in the form of the **Cube Shipper database**.

This database helps answer the following question:

Which of our standard distribution shippers / pallet boxes / trays should we use for this product in order to maximise fill?

It examines automatically the efficiency with which a given product (perhaps a case) can be fitted within each of shipper and ranks these. In such solutions any or all of the valid case orientations may be used to maximise fill.

Whilst the above database can be very useful, it does not address the question of rationalisation at an earlier stage in the logistics function - the generation of case sizes:

Do we have a case which we use already for some product(s) which could also be used for this product?.

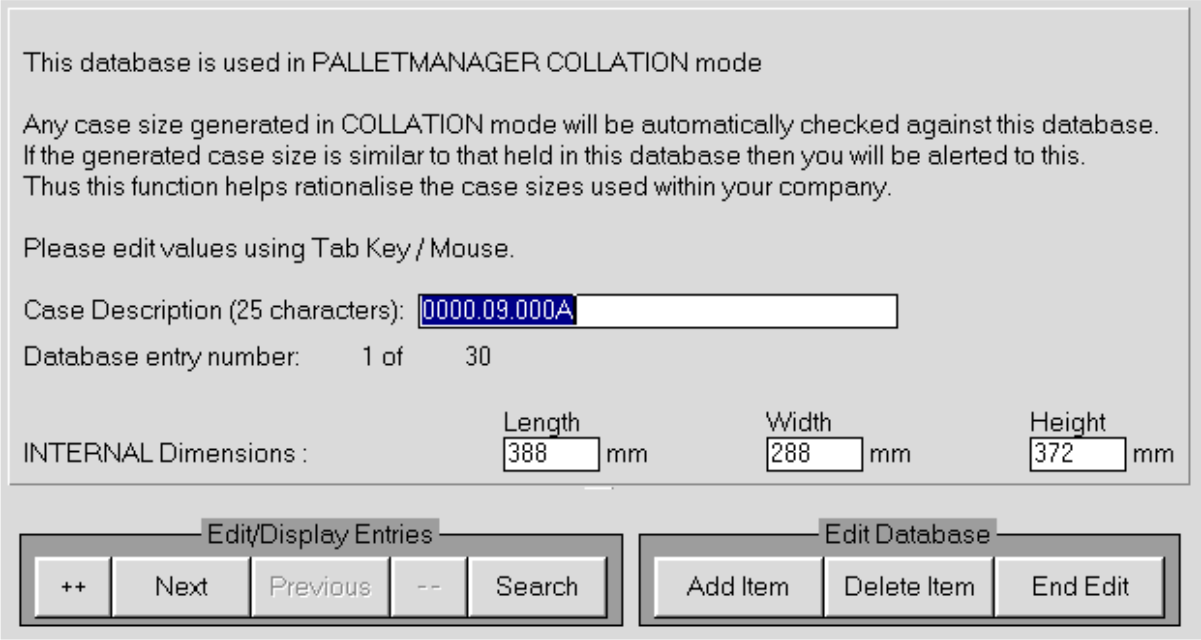
It may well be that your company has certain standard case designs which you would like to consider using, if appropriate, for a given product. PALLETMANAGER, using the Case Database described below, provides you with a facility to identify whether any existing case designs are similar in internal size to the case sizes generated by PALLETMANAGER in Collation / Tertiary mode.

13.2 Case Database Creation.

The first stage in implementing the Case Match database facility is the input into a datafile of existing standard case sizes. Details of up to 200 standard case sizes can be input as described below.

To enter data into the database you select **CaseBase** from the opening PALLETMANAGER menu.

You are then presented with the Case Details Screen which provides you with the facility to input the **internal** dimensions of your standard case sizes.



The options shown allow you to enter / modify / delete the descriptions and sizes of up to 200 standard case sizes. These sizes and descriptions are held in a datafile in **sorted order** according to shipper description.

The Next and Previous buttons allow you to browse through the database. The ++ and -- perform a similar function initially but in a large database move more through the database several entries at a time. Entries can be added or deleted. Having completed changes **End Edit** will save the database updates (if any) to disk. If you need to abandon all changes a **Quit** option is available at the top left of the screen (as with all other PALLETMANAGER screens).

The simple database created (CASEBASE.DAT) is automatically utilised during a PALLETMANAGER Collation / Tertiary run.

13.3 Case Database Use.

Whenever PALLETMANAGER Collation / Tertiary is run, a check is made to see whether you have set up a Case database.

If so, then, as the Results Summary Screen (Screen 5) is displayed, each case size is checked against your datafile, and, where a results line utilises a case whose internal dimensions are 'similar' to those of an existing design in the datafile the line reference number will be preceded by a star (*****) character.

The degree of 'similarity' is defined as follows:

If X, Y and Z are the internal dimensions of a case generated by PALLETMANAGER and X_d, Y_d and Z_d are the internal dimensions of a case on the database then the case generated will be 'flagged' as similar if the following is true.

If X_d lies between X and X plus 5% AND

Y_d lies between Y and Y plus 5% AND

Z_d lies between Z and Z plus 5%.

*Thus when a ***** is shown the database case (internal size) is as big or slightly bigger than that generated by PALLETMANAGER as being required for the Collation..*

If a case dimension (say X) of 300mm is generated, the database will be examined for values where X_d lies between 300mm and 315mm. The 'degree of tolerance' has a 5% default value, this being held on the first line of the file **casebase.dat**, together with the number of entries in the datafile. Users may modify this value using a text editor (e.g. Wordpad).

The screen and printed reports also provide you with information on the Case Description of the CaseBase entry which has been identified as being similar to the Case generated using Collation / Tertiary.

13.4 Other Rationalisation Issues.

Many companies find themselves in a position where they have hundreds or thousands of different case sizes which they would like to rationalise. Whilst each product can be tackled individually the question may still remain:

What cases sizes are the most efficient to use for my products?

Gower Algorithms have in-house expertise and software which may be able to assist in answering such a question - please contact us for further details.

13.5 The STORE Database.

As detailed in Section 9, the STORE module which retains details of specifications for subsequent re-printing or re-run, utilises a database file Storfile, together with an index file.

The STORE process creates a compact numeric based database of each solution. The current release accommodates up to 5000 product entries. The display and printing actions from STORE can carried out on the same PC as originally used to solve the problem, or another (remote) PC using a 'stand-alone' STORE display configuration. A file with 5000 entries is unlikely to exceed 10Mb of disk space. The module can also be used (outside of PALLETMANAGER) to create a CD/ Intranet / Internet based resource for display of specifications.

For a number of technical reasons this process is not part of the PALLETMANAGER suite, and may require GOAL technical input to translate the Storfile to the necessary HTML and graphics formats. However the Webbase facility described in detail in Section 14 of this manual will normally cater for such requirements. Such files can then be held on a CD or Intranet and accessed by all users.

Please contact GOAL for further details.

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SECTION 14

The Webbase Module:

Internet / Intranet / CD based display of specifications.

(Covers: Introduction; Why Webbase does NOT replace STORE; Creating Webbase files; Displaying the Webbase; Technical - file creation; Technical - index file; Deleting specifications; Converting a STORE database; Creating a CD based Webbase; Adobe PDF)

Reader Note: *The features described in this Section generate files on your computer which may subsequently need to be copied to other computer systems. The discussion in Sections 14.1 to 14.4 describe the features from a PALLETMANAGER user perspective, whilst later sections are more oriented towards the needs of your technical support team.*

If using Explorer 6 or later you may find that the report ***image is initially displayed in miniature*** *with a button to 'enlarge to normal size'. This can easily be corrected using the instructions in Appendix 1.12.*

14.1 Introduction.

The **PALLETMANAGER Webbase Module** is designed to meet the needs of users who wish to make their palletisation specifications available to others in electronic format. It forms one of the 'add-on' modules of **PALLETMANAGER** in the same way as (say) Collation, e-PALLET etc. The **Webbase** module provides a set of powerful features designed to make it easy for users to place some or all of their palletisation specifications on an Internet / Intranet server or onto a CD for access / use by colleagues, suppliers or customers. Specifications can then be accessed by others using just their standard web browser (e.g. Explorer, Netscape).

As well as providing a mechanism whereby newly calculated specifications can be saved in this Web format, **PALLETMANAGER** also includes facilities for users who utilise the existing **STORE** module so that they may also convert some or all of their **STORE** specifications to the **Webbase** format.

However the Webbase module is NOT a replacement for the existing STORE module (where used), and the reasons why this is the case are discussed in Section 14.2 below.

The steps in using **Webbase** are:

1. You select those report(s) they wish to add to the **Webbase** from the same screens from where you print / view specifications.

2. You can also add some or all of the entries from your existing **STORE** database (where available / used) to the **Webbase**.

3. To display these specifications on your computer you then select the **Webbase** Module from the Opening **PALLETMANAGER** screen.

4. Having done this the files held on your computer can be copied (usually by your technical support team) to an Intranet / Internet server (or they can be written to a CD) for others to access using a web browser.

14.2 Why the Webbase Format does NOT replace the STORE Module.

PALLETMANAGER users with a **STORE** license use this module to maintain a database of their specifications. Using such a database enables them to re-call a specification to the screen, re-print it, or use the **e-PALLET** email facility to send to others electronically. **In addition** users can select to 're-run' a specification held in the database. In this mode all product, packaging and palletisation information is retrieved from the **STORE** database and any required change can be made to this data before a re-calculation is carried out. In doing so only a minimum amount of new data entry is required in order to re-calculate a solution. In addition the **STORE** database is compact, with 2000 specifications occupying perhaps 10Mb of disk space. In summary:

- **STORE** allows screen viewing, re-printing and emailing of specifications.
- It also allows minor changes to made to past specifications and re-run.
- It allows printing / viewing / emailing of reports in a language different from that used when the specification was saved (now English, French, German and Spanish are available).
- It provides compact storage for many thousands of specifications.

In contrast to the above, the **Webbase/JPG** Database introduced with this release has some advantages and some drawbacks.

Advantages of Webbase/JPG format:

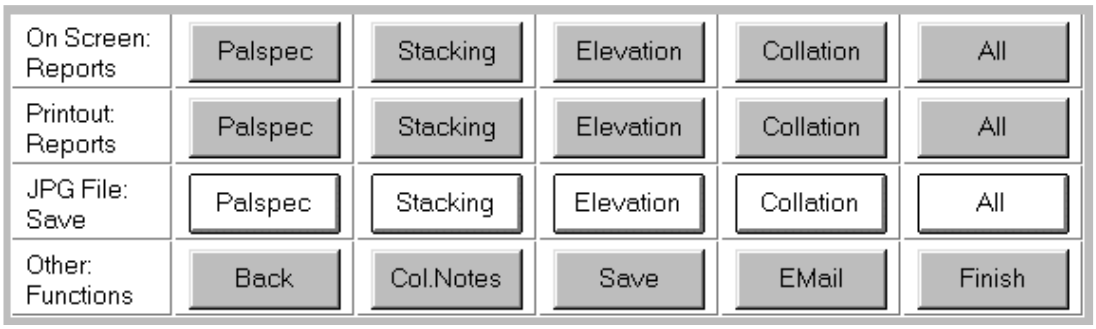
- Anyone with a web browser can view your specifications, print them out or forward the reference for the specification to others with access to the datafiles.
- Specifications held in this way cannot be modified (e.g. the language of the report is fixed).
- The person viewing the specifications does not require a **PALLETMANAGER** license.

Drawbacks of Webbase/JPG format:

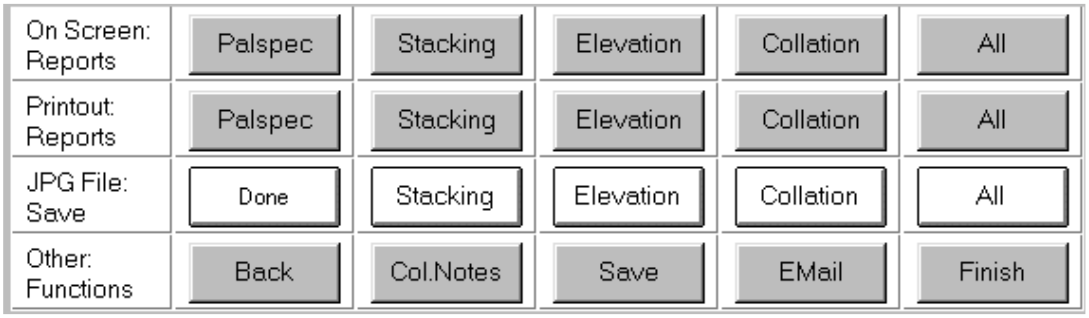
- If you needed to re-calculate the specification given a change in data (and did not utilise the STORE module), then **ALL** of the data associated with the product would have to be entered manually again into **PALLETMANAGER** data screens.
- If you have saved a specification in (say) English, you cannot then produce the same report in (say) Spanish.
- All formats available for the storage of graphics reports (such as those JPG files used by Webbase) are relatively large. Typically around 100 times more storage space is required to store the report data than when using the **STORE** database. A **STORE** database for 5000 reports might require 5Mb of disk space whilst the same set of reports in **Webbase** might require the whole of a standard 600Mb CD.

14.3 The Creation of Webbase Files.

PALLETMANAGER screen and printer reports are selected from one of two screens - that displayed immediately after selecting the pallet layout to be used, or the very similar screen displayed when accessing the **STORE** database. Both these screens have now been extended to provide an additional set of (white) buttons relating to **Webbase/JPG** file creation. An example is shown below.

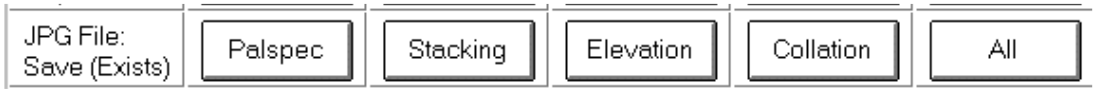


If the user wishes to add the current specification to those held in the **Webbase** Database then the button(s) associated with the required report(s) are selected. An on-screen message indicates that files are being saved, and when the action is complete the button text will change to 'Done'. For example after the **Webbase/JPG** Palletisation Specification is selected the screen will change to that shown below.



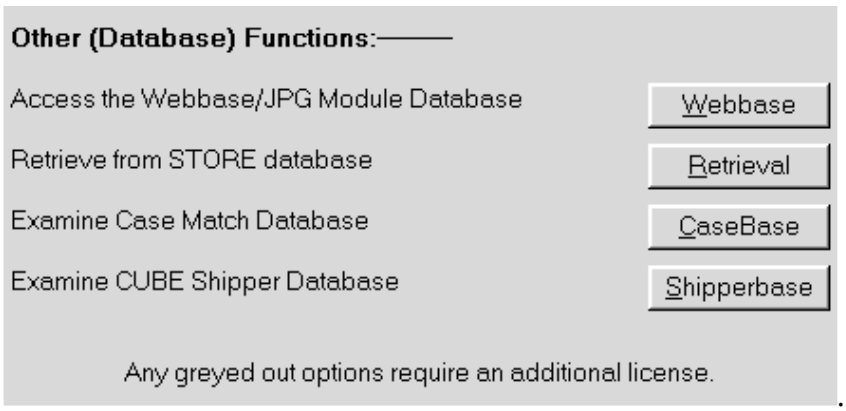
Thus any of the reports which might otherwise be viewed or printed from this page can be saved to this **Webbase** database.

If you are re-calculating a specification for a product already held in the **Webbase** database then on arriving at the Print / View screen the text adjacent to the **Webbase/JPG** button will indicate that a file already exists - as shown below. It will be automatically replaced with the new version if JPG File save is selected.

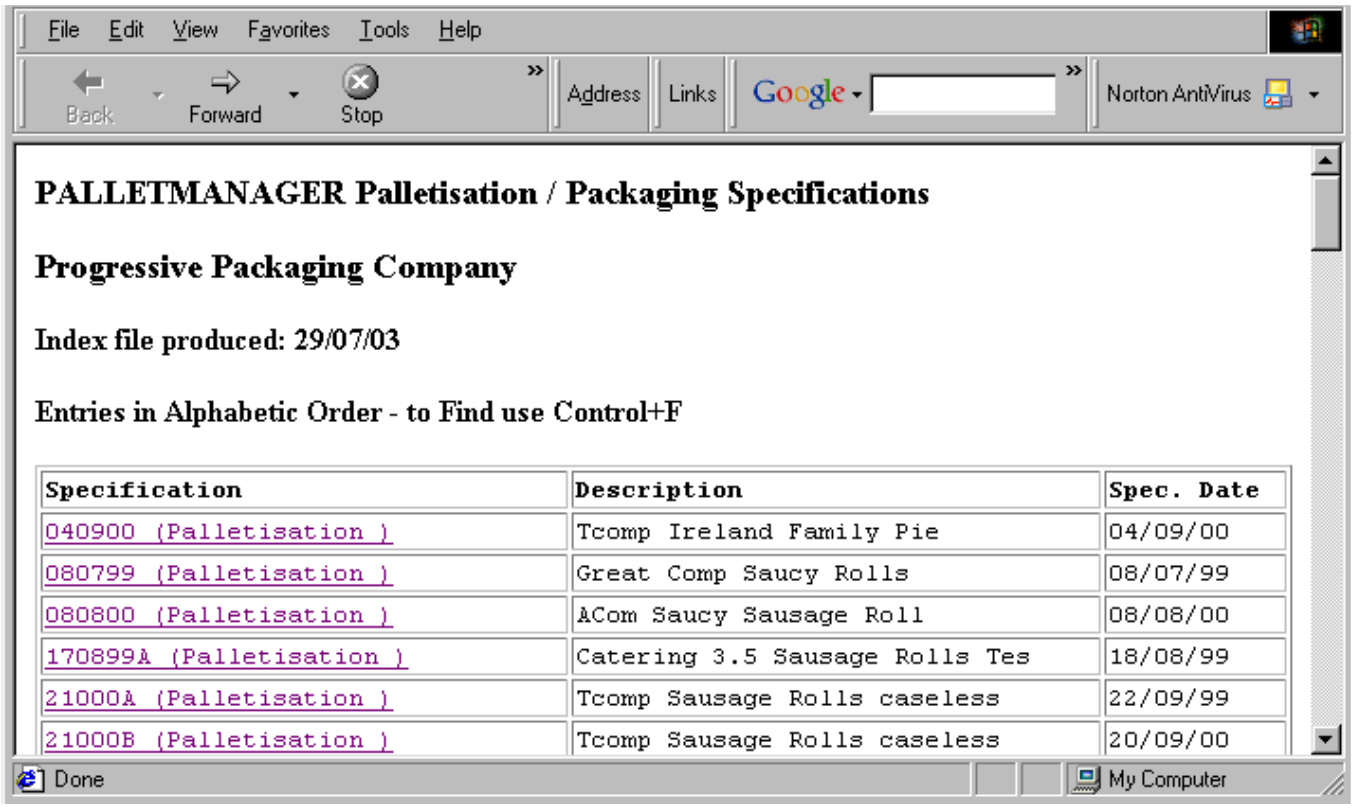


14.4 Displaying the Webbase Files.

Those users with a license to use one or more of **PALLETMANAGER** Database features will be familiar with the access buttons on the opening **PALLETMANAGER** screen. The new **Webbase** Database is accessed from the same point.



When the **Webbase** option is selected the files previously saved into the **Webbase** are examined and an index file is created which contains full product information for each of these (index.htm). The default web browser is then automatically launched and the index file is displayed. An example of such a display is shown below.



The left hand column shows the Product Code (as entered by the user into **PALLETMANAGER**), with the other two columns showing the Product Description and the date on which the report was created / saved. The entries are sorted in alphabetic order based on product code.

The Product Code entries are hyperlinked and selecting any of these using the mouse will display the appropriate report - which can then be printed if required.

If a user is unsure of the product code they can hold down the Ctrl key and press F which will bring up a 'Find' dialog box allowing users to search the index page for any code / description / date.

Depending upon the type of analysis carried out (Palletise, Collation, Cube etc), and the number of these reports that the user has selected to be added to the **Webbase** database, there may be up to 6 reports associated with a particular product code. In the above display all are Palletisation Specifications (as indicated on the screen). Appropriate labels are provided for Collation Reports, Stacking reports etc.

These files are stored in a folder of their own (jpgfiles) beneath that in which **PALLETMANAGER** is installed, and are suitable for copying (usually by your IT staff) from your computer to an Intranet / Internet server (or to a CD) where they can be accessed by others. These users can use their web browser (e.g. Internet Explorer) to view the index file and the specifications, and make printouts of the same.

IMPORTANT NOTE: The size of the Webbase images has been selected so as to be suitable for display (and printing) on displays of 800*600 or 1024*768. If using Explorer 6 you may find that the report image is initially displayed in miniature. This can easily be corrected using the instructions given on screen at the top of the Index file and also given in Appendix 1.12.

Reader Note: *As described at the beginning, Sections 14.5 onwards are of a slightly more technical nature, as appropriate for those who may be involved with the transfer of* ***Webbase*** *files to other systems.*

14.5 Technical Issues - File Creation.

Each report saved to the Webbase uses the .JPG format and is at a resolution suitable for display and printing using 800*600 or 1024*768 screen modes. The JPG report file would (ideally) be given a name which would be identical to the product code of the product. However the file naming conventions of different operating

systems means that some characters used as product codes would not be valid within filenames. Thus **PALLETMANAGER** adapts the product code (if required) to ensure files created should be valid on whatever computer systems they may later be held. Originally the filenames created were based solely on the product code (14 characters). However to provide a more flexible system the current filenames created also utilise the first 12 characters of the description - thus one could now have a single product code 'solved' using different load heights for different customers with the height limit or customer details being entered in the first 12 characters of the description.

Filenames based on the product code (in later versions including the first 12 characters of the description) and are terminated with extensions which reflect the report type. These extensions are listed below:

Palletise Report: -Pal.jpg

Palletise (Top Layer): -PalT.jpg

Collation: -Col.jpg

Collation (Sub Primary): -ColSp.jpg

Cube: -Cube.jpg

Stacking: -Sta.jpg

Elevation: -Ele.jpg

Ti/High: -Thi.jpg

All the files produced are stored in the folder **JPGFILES** which will be found as a sub-folder to that in which **PALLETMANAGER** is installed. For each .JPG file created a small file (.inf) is created holding basic information on product description, date etc. These files are used when creating the index.htm file. **All files held in the JPGFILES folder - both .JPG and .INF - must be backed up securely.**

14.6 Technical Issues - INDEX.HTM

This file is produced by **PALLETMANAGER** and uses a basic HTML format which can be edited by a user using any suitable web development tool before being placed on an Intranet / Internet. After the .JPG files are created an HTML index file (sorted in alphanumeric order) is produced in the JPGFILES folder (replacing any previous version) referencing all the .JPG files. This file will be created when the user selects **Webbase** (from the opening menu) or, when a batch conversion from a STORE database is carried out (see section 14.10) at the termination of that process. In operation all the .JPG files (and their associated .INF information files) are accessed and a suitable index file created.

You should note that **every time** a new product is added to the Webbase (and the Webbase is accessed from the opening PALLETMANAGER screen) a complete new file index file is created. So that the file loads and formats quickly, if there are more than 250 entries, then each block of 250 entries forms its own HTML table. Naturally all the product information is held in the single index file. A technical limit of 20,000 specification entries has been catered for - far more (one trusts) than will ever be used! Tests suggest that around 3000 entries are the upper limit for fast loading of the index file.

In this release a very limited level of customisation is available to the user. In the above browser display (see 14.4 above) reference is made to the company name - 'Progressive Packaging Company'. On installation, no such company reference is provided in the display. However a user may use a basic text tool (e.g. Notepad/Wordpad) to produce a file named **COMPANY.INF in the PALLETMANAGER installation folder**. The text from line 1 of this file (up to 40 characters) will automatically be used as a descriptor at the top of the HTML Index file each time it is created.

14.7 Deletion of Specifications.

As described earlier, all the .JPG (and .INF) files created are named according to the product code. In this release, if you wish to delete specifications from the **Webbase** Database, Windows Explorer should be used to view and delete the .JPG files which are not required. On the next occasion when the Webbase is accessed a new (updated) index file will be created leaving out the files which have been deleted. Ideally (but not necessarily) the .INF files associated with deleted .JPG files should also be deleted. **It should be stressed that for products held in the Webbase, not only the .JPG files but also the .INF files are vital for ongoing indexing. Appropriate security backup of all these files is required.**

If a particular group of files are not required - perhaps you never use Stacking reports but find that some have been produced in the JPGFILES solder, then you could also use Windows Start / Find to locate and delete these. Such files all have names terminating with either Sta.inf or Sta.jpg .

Using Find those files in the JPGFILES folder matching *Sta.* could be located and deleted.

14.8 Notes on Converting the whole of a STORE Database.

Users with a small number of **STORE** specifications can add these manually to the Webbase using the following procedure:

Use the **STORE Retrieve** Option on the Opening Screen, select the product you wish to add the Webbase, and then select Print / Inspect. Screen 9P is then displayed from which you could print or view on-screen the report (s) available for this product. An extra set of (white) buttons allows you to create JPG file(s) which will be added to the Webbase. Repeat this action for other products you wish to add to the Webbase.

However those with many specifications would find the task of converting all manually daunting. For this reason we have also provided a mechanism for converting **all STORE specifications to .JPG format** without any user action. This is described in 14.9 below.

However, before going ahead with this procedure you are advised to consider the following:

- Do you really need all your reports in web format? Most examples of STORE databases we have seen contain very large numbers of redundant specifications and perhaps a few dozen currently active.

- A database of (say) 2000 products could typically produce up to 7000 or more reports (Palletise, Collation, Stacking etc etc), and these would occupy perhaps 850Mb. (This is a function of all graphics formats and not just the .JPG format used here). The Index file to access this number of reports would be very large and load very slowly.

- To convert this number of data entries would also be time consuming. Even under automatic operation one must allow perhaps 4 seconds / report - i.e. at least 8 hours for 2000 products / 7000 reports!

14.9 The Automated Conversion of a complete STORE Database.

The procedure described below will convert ALL the specifications held in the STORE database to web format and save these in the JPGFILES folder beneath that in which PALLETMANAGER is installed. Before starting the process you will have the opportunity to select which types of reports you wish to output to the Webbase.

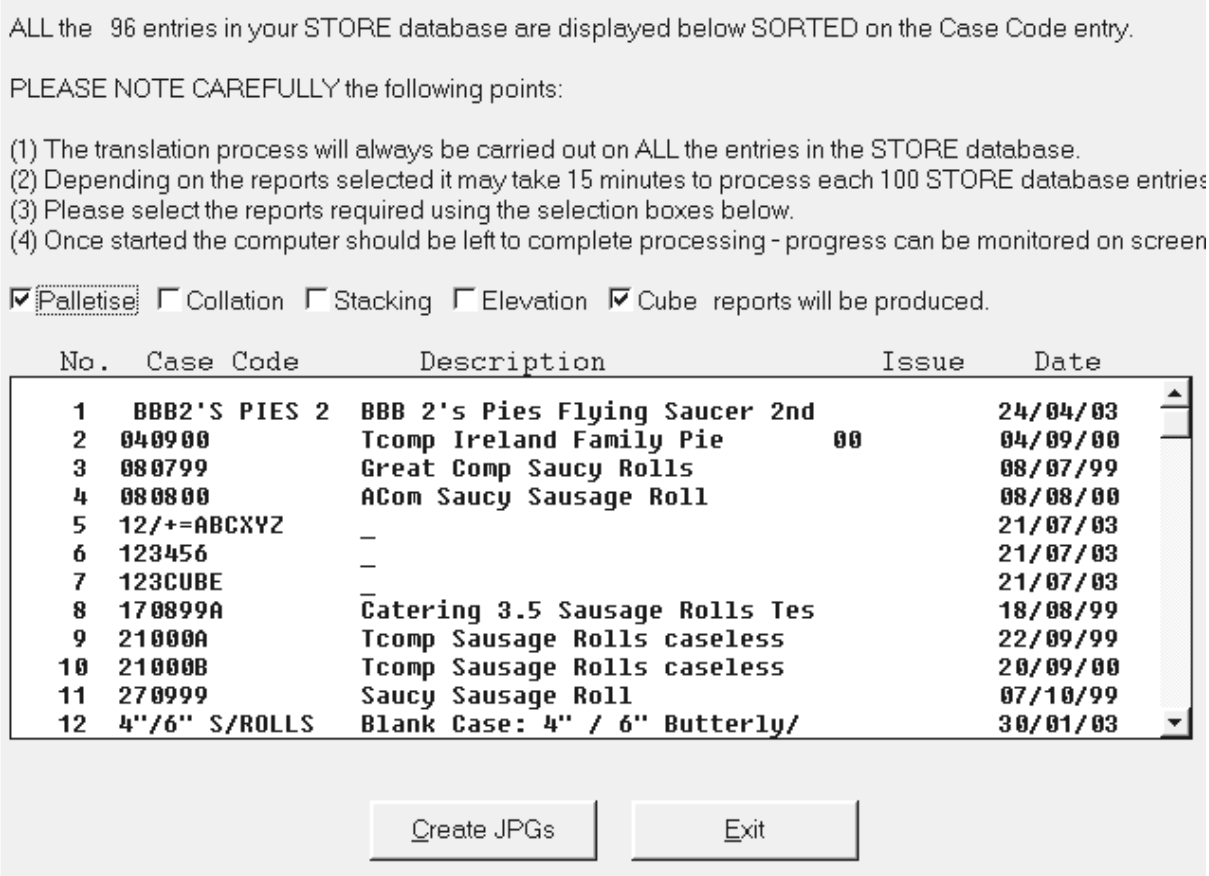
In doing so the procedure will add to any files currently held there, but overwrite (**replace**) any which may already be there that have the same name (i.e. are for the same product code). Thus you may wish to consider what action should be taken with any files already in that folder BEFORE selecting the conversion program.

In addition you may need to consider whether you have sufficient space available on your disk for the files. As discussed above a database of 2000 products (with all report types selected) may produce around 7000 reports and require perhaps 850Mb for file storage. (Note that if modes such as CUBE predominate - where each product produces just a single report - the number of reports produced will be substantially lower)

In order to carry out the conversion process:

- Ensure that PALLETMANAGER is **NOT** running.
- Ensure that the computer has sufficient hard disk space free (see above).
- Ensure that the **computer will NOT be required** for the likely period taken for the conversion process - perhaps 15-20 minutes for each 100 product codes.
- Use Windows Explorer to locate the program **BATCHJPG** which will be found in the **PALLETMANAGER** folder (default folder on C: drive, folder PMNT), and double click on the **BATCHJPG** entry to start the program.

You will then be presented with the screen below from which the **Create JPG button** can be used to start the process.



On entry the Palletise and Collation reports are automatically selected. You are able to decide which types of report are produced before you 'Create JPGs'. As the process continues the database list will scroll down (with the cursor marking the entry being processed), and as each file is produced a screen message is displayed. **Once started the process cannot be stopped** (except by using the Ctrl / Alt / Del key combination and killing the conversion process). Obviously the computer screen can (should) be switched off if the machine is to be left on overnight.

Once completed the screen will display the final group of entries from the STORE database. The Exit option can then be selected at which time an Index file will be created. If you have produced a considerable number of reports then the indexing process may take a couple of minutes - a suitable message is displayed on screen.

14.10 Creating a CD based set of Specifications.

It is clearly possible to copy all the files found in the JPGFILES folder to an Intranet / Internet server and for users to access the specifications using their web browser via the index.htm file created by

PALLETMANAGER. Likewise the same set of files could be copied to a CD and the same access method used.

A simple enhancement to a CD based set of specifications would be to have the CD auto-start and to display the index file automatically. This can be achieved if two additional files, which will be found in the **PALLETMANAGER installation folder**, are copied to the CD together with the index files . These are the files **autorun.inf** and **goal.exe**.

Technically it is not necessary to copy the .INF files found in the JPGFILES folder to the Internet / CD. **However these files are vital to the ongoing indexing of the database** (they contain product information etc), and given their small size it is strongly recommended that all files in the JPGFILES folder be copied to whatever media is being used.

14.11 Adobe PDF - a technical support section!.

In designing the **Webbase** module our objectives have been to provide a **quick** and **reliable method** of displaying specifications on both Internet / Intranet or CD. This has been achieved using the **Webbase** JPG file format. **However**, we are well aware that in some organisations there might be a requirement to present the **Webbase** in an **Adobe PDF format and this is indeed possible** as described below.

The remainder of this section discuss issues relating to the possible use of PDF format.

PALLETMANAGER users may be aware that the **e-PALLET** add-on module used to email palletisation specifications uses the Adobe PDF file format. When developing the **Webbase** module the PDF format was one of those formats considered for use, however it was eventually rejected on 3 grounds:

(1) Methods to generate PDF files in large numbers **directly** from **PALLETMANAGER** did not meet our reliability criteria.

(2) Users selecting from the Webbase Index file would need to load the (free) PDF viewer each time they wished to access the specifications.

(3) Recent versions of the Adobe Viewer have been criticised as being somewhat slow to load.

However a number of companies provide reliable low cost software (USD 40-60) which will convert images from various graphics formats to the PDF format. We have used software from one such company (www.verypdf.com) for a number of years and in building the **Webbase** module we have included links so that those who must use the PDF format **can license a copy of the appropriate software from Verypdf,** and automatically link that software with **Webbase.**

Specifically they produce 2 products which could be used with **Webbase.**

(Route1) Some users may have a requirement to generate an Intranet / CD based set of specifications in PDF format on an occasional basis (say every 3 months). In doing so they would be quite happy to take a set of Webbase JPG format specifications, quickly (< 5 minutes) convert them to PDF format, and to then place these files, together with an index file, onto the Intranet / CD. The **Windows application Image2PDF** (approx USD40) will quickly convert the .JPG files of Webbase into multiple PDF files. As described below (14.12) we have also provided in the **PALLETMANAGER** toolkit a program which will automatically index these .PDF files (to create an index file INDEXP.HTM) in an identical fashion to that used for the Webbase .JPG files.

(Route 2) Other users may have a requirement to maintain at all times a up-to-date set of PDF format specifications. This can be achieved by using the **Command Line version of Image2pdf** (approx USD 60) to automatically create .PDF files **each time the normal Webbase 'Save JPG File' function is executed**. At the time the Webbase .JPG specification is created the Image2PDF software is immediately executed to create an identical PDF format file. Thus at any time both .PDF and .JPG files would be available for each specification.

The application of these two 3rd party solutions is described.

14.12 PDF Links.

The **Route 1** approach would require the user to use the **Windows Image2PDF** software to be used to convert all the .JPG files in the JPGFILES folder to .PDF files, **these also being saved to the JPGFILES folder.** To create the index file INDEXP.HTM, the program **MAKEINDP** found in the **PALLETMANAGER** folder would be executed (view in Explorer and double click). The INDEXP.HTM file will be created in the JPGFILES folder, and will provide hyperlinks to all the .PDF files.

The **Route 2** approach would require the **Command Line** version of Image2pdf to be installed in the **PALLETMANAGER installation folder.** At the moment that any Webbase .JPG specification is created the Image2PDF software is executed (invisibly to the user) to create an identical PDF file. Thus at any time both .PDF and .JPG files would be available for each specification. Once again, to create the index file INDEXP.HTM, the program **MAKEINDP** found in the **PALLETMANAGER** folder would be executed (view in Explorer and double click). The INDEXP.HTM file will be created in the JPGFILES folder, and will provide hyperlinks to all the .PDF files.

In practice, if **PALLETMANAGER** finds that PDF files are located in the JPGFILES folder then it will, when **Webbase** is selected from the opening menu, automatically create both the standard INDEX.HTM (for the Webbase.JPG files) **and** INDEXP.HTM (for the .PDF files).

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SECTION 15 -

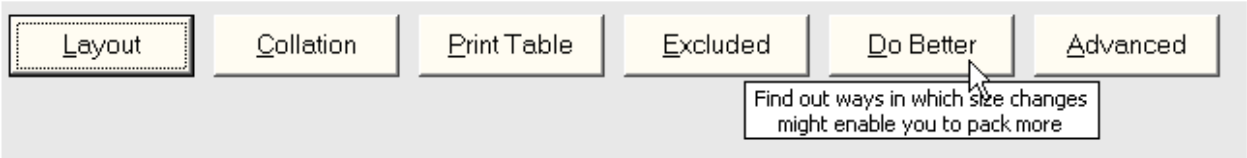
DO BETTER!

(Covers: Introduction, Basic Considerations, Do Better Operation, Do Better - a Worked Example, Do Better for Collations , Do Better for Square Objects, Additional Information.

15.1 Introduction.

In all modes of operation **PALLETMANAGER** will **always** provide you with **optimal** pallet layouts for the given case / primary / sub-primary unit. However in doing so the software is naturally limited by the dimensional values you provide for the product / case itself, for the pallet load area and loading height, and the collation quantities and packaging specification to be used.

When examining the palletisation solutions in any of **PALLETISE**, **COLLATION** or **TERTIARY** modes you may well wonder how close you were to obtaining an improved number of units / pallet. The **Do Better** function is one of a number of unique and powerful facilities in **PALLETMANAGER** to help you answer that question. It is accessed from the main results screen (Screen 5) in all modes of operation:



In summary the function takes the currently highlighted solution (which you 'like' but which perhaps does not have a very good pallet area utilisation), and explores similar case sizes (typically within a few mm.) to see how a minor change in case / primary length / width might provide an improved number of cases / pallet. In doing so it provides you with a number of very similar case sizes which fit more cases / pallet. It does this by varying case length and width, but may in addition report designs where (say) a small increase in case length together with a small decrease in case width provides an improved solution. It does **not** change the case height for reasons discussed immediately below.

We must emphasize that the results presented are unique for each problem tackled. As will soon become evident to you they are in no way based on some inbuilt set of 'nice' values but are calculated to meet each specific problem tackled.

Before explaining in detail what it does we firstly should consider some of the features already covered in the manual which address the same issue.

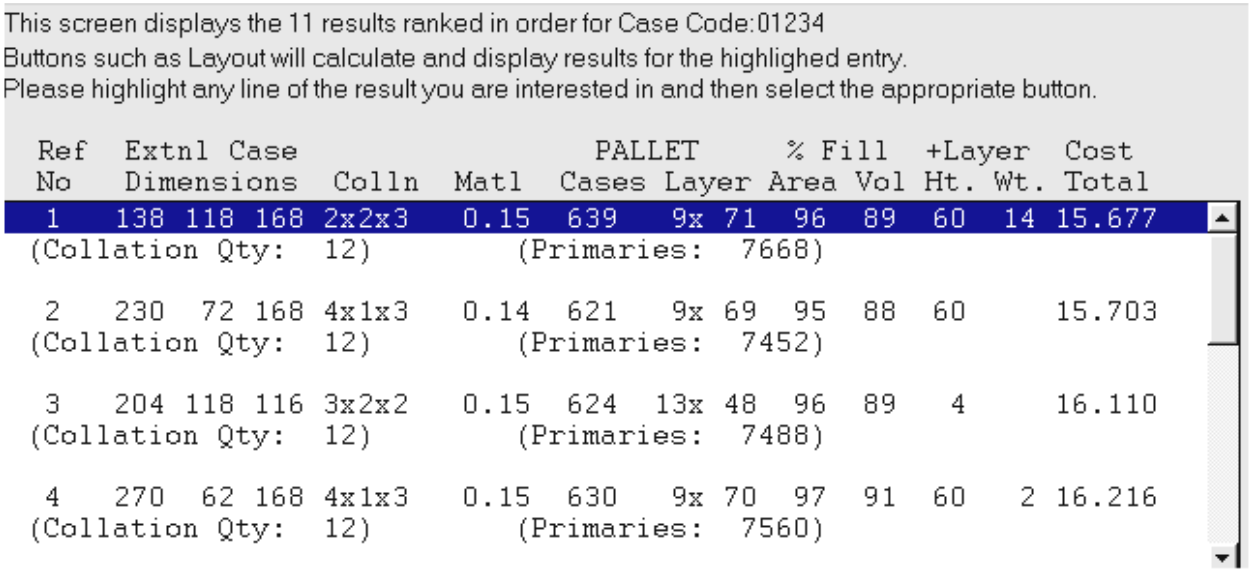
15.2 Some Basic Considerations.

Whilst it might be tempting to 'jump in' and use the function on every occasion there are a couple of things that might usefully be considered first.

(a) In all modes of operation the **Screen 5** report which ranks the solutions obtained includes a column header '+Layer Ht.' - that is the extra loading height which would be required to accommodate an extra layer of product on the pallet. In the example below (taken from Section 5 of this manual), the best solution fits 639 cases / pallet, but if ***just 4mm extra*** was available **Result 3** would fit an extra layer giving a total of 672 cases / pallet.

Thus, **before** jumping into **Do Better**, you should examine the results on Screen 5 to see if simply changing

the load height a fraction (if possible) might have the desired result. An equivalent change might also be to reduce the height of the primary or case just a fraction - Reference 3 below needs to 'loose' just 4mm over 13 layers! to allow an extra layer to be fitted. Thus if a case 115mm high (rather than 116mm) was suitable then the extra layer would easily fit.


This screen displays the 11 results ranked in order for Case Code:01234
Buttons such as Layout will calculate and display results for the highlighed entry.
Please highlight any line of the result you are interested in and then select the appropriate button.

Ref No	Extnl Case Dimensions	Colln	Matl	PALLET Cases	Layer	% Fill Area	Vol	+Layer Ht.	Wt.	Cost Total
1	138 118 168	2x2x3	0.15	639	9x 71	96	89	60	14	15.677
(Collation Qty:	12)			(Primaries:	7668)					
2	230 72 168	4x1x3	0.14	621	9x 69	95	88	60		15.703
(Collation Qty:	12)			(Primaries:	7452)					
3	204 118 116	3x2x2	0.15	624	13x 48	96	89	4		16.110
(Collation Qty:	12)			(Primaries:	7488)					
4	270 62 168	4x1x3	0.15	630	9x 70	97	91	60	2	16.216
(Collation Qty:	12)			(Primaries:	7560)					

Whilst there are clearly other issues linked to this (e.g. How many layers are you happy to stack on a pallet for stability or other reasons; the costs of packaging material for a particular reference number etc), getting the basics of height utilisation right are a vital first step.

(b) In addition you might be better in some circumstances using the **Fixed Volume** module which may be included in your license. This module is described in detail in Section 7 of the manual and is appropriate when the pack / case size (length, width and height) might be varied a little but the **VOLUME** of the resultant unit must be the same. This might be a requirement when packing a fixed volume of a liquid or powder etc. Thus, if you have a requirement to retain case / primary VOLUME you should utilise Fixed Volume to achieve a better solution. [This is accessed - where licenced - from the Advanced Function button immediately before selecting **Pack**].

Assuming that the you have considered and discarded the above two suggestions we can now look at how **Do Better** operates.

15.3 Do Better Operation.

A frequent question posed during training and demonstration sessions is 'What is a good case size to make good use of the pallet?'. There is no easy answer to this, as designs which might make fully use of the pallet area (e.g. a 200mm*200mm case on a 1200*1000 pallet) might be unsuitable as this size can only form a column stack, which may well be unstable in use.

PALLETMANAGER Collation may design dozens of suitable case sizes for a collation of a given primary but each must necessarily be based on the primary dimensions you input - it is no use 'inventing' a case and then hoping things will fit into it!

The **Do Better** function takes details of the **highlighted entry** on the Results Summary Screen (Screen 5) and analyses how minor changes in the length and width of the case might be made to fit more units / pallet. (In Collation mode the impact on primary size is naturally also reported).

To utilise the module:

- ***Highlight an entry*** *in the results table which you 'like', but which has a lower pallet area utilisation than you would wish.*

- *Select the **Do Better** button.*

We should emphasize at this point that the function will **not** make any changes to the data you have entered into **PALLETMANAGER**. It **will** advise on various ways in which more cases could be fitted - both to the screen and if required to printer - but it will be up to you to decide how best to effect any such changes that might be practically feasible.

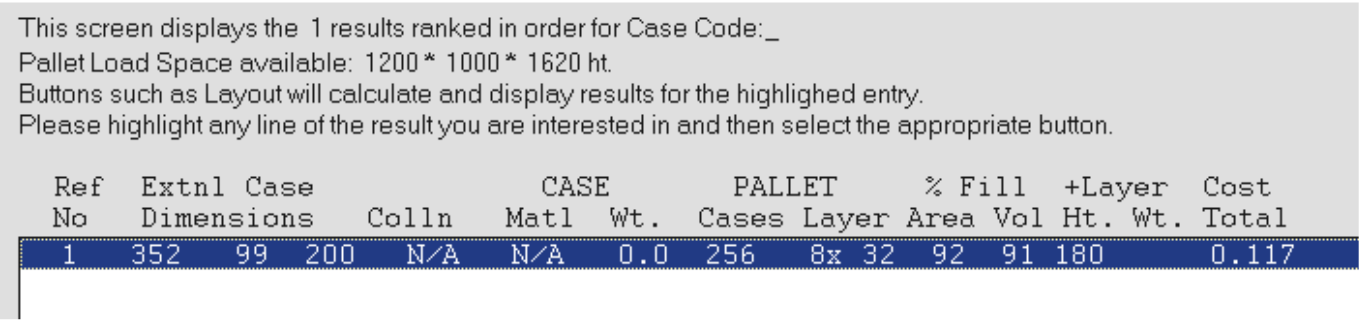
In a **PALLETISE** problem you may need to question whether any such minor changes in case size might be possible.

In a **COLLATION** problem it may be that changes to the packaging style (thinner dividers, smaller gaps etc) may achieve suitable changes to the size of the case. Sometimes the size changes needed for an improved solution may be 1mm or less, and in some instances you may even be able to increase one of length or width by a small amount (reducing the other), and still fit more units / pallet.

15.4 Do Better Analysis - A Worked Example.

As an example, we will consider a problem where you have a Case Size of 352mm * 99mm * 200mm high which you wish to palletise on a 1200*1000 pallet. For the moment we will assume that you are using PALLETISE mode to come up with the solution.

Entering this data into PALLETISE results in an optimal solution fitting 32 cases on each pallet layer, and with 8 layers this provides for 256 cases / pallet. The standard results screen (Screen 5) for this problem is shown below.


This screen displays the 1 results ranked in order for Case Code:_
Pallet Load Space available: 1200 * 1000 * 1620 ht.
Buttons such as Layout will calculate and display results for the highlighed entry.
Please highlight any line of the result you are interested in and then select the appropriate button.

Ref No	Extnl Case Dimensions	Colln	CASE Matl	Wt.	PALLET Cases	Layer	% Fill Area	Vol	+Layer Ht.	Wt.	Cost Total
1	352 99 200	N/A	N/A	0.0	256	8x 32	92	91	180		0.117

From the results given (and also from looking at the layout diagrams), it is clear that the case is not a very good fit on the pallet. The column '% Fill Area' - which reports how much of the pallet area is filled with product is just 92%, thus 8% of the pallet area is wasted (not filled).

What is also clear from the above table is that making a small change to the loading height limit (1620mm) or to the height of the product itself (200mm), would not allow any extra layers to be fitted on the pallet [the above table tells us that we would need an extra 180mm to allow an extra layer].

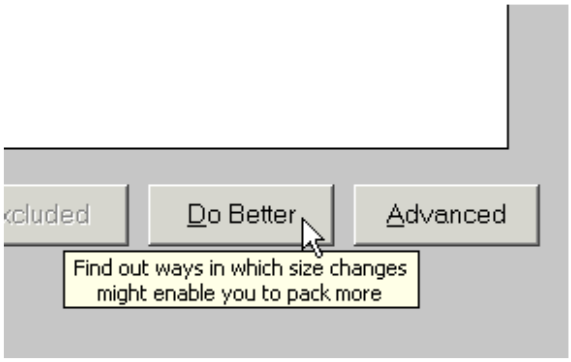
As described a little earlier in Section 15, before considering the potential impact of changes to case length / width (using **Do Better**), one should always consider whether product / pallet loading height issues are of importance.

On this occasion we are faced with an existing case size which makes good use of the pallet loading height but has length and width dimensions which, when loaded in the best possible way (optimally), waste 8% of the pallet area.

Can YOU Do Better?

Obviously if the case length and width cannot possibly be changed at all then the answer must be no, but on the assumption that a very minor change might be made (perhaps as little as 0.1mm!!), we can use the **Do Better** module to show us the impact of small dimensional changes.

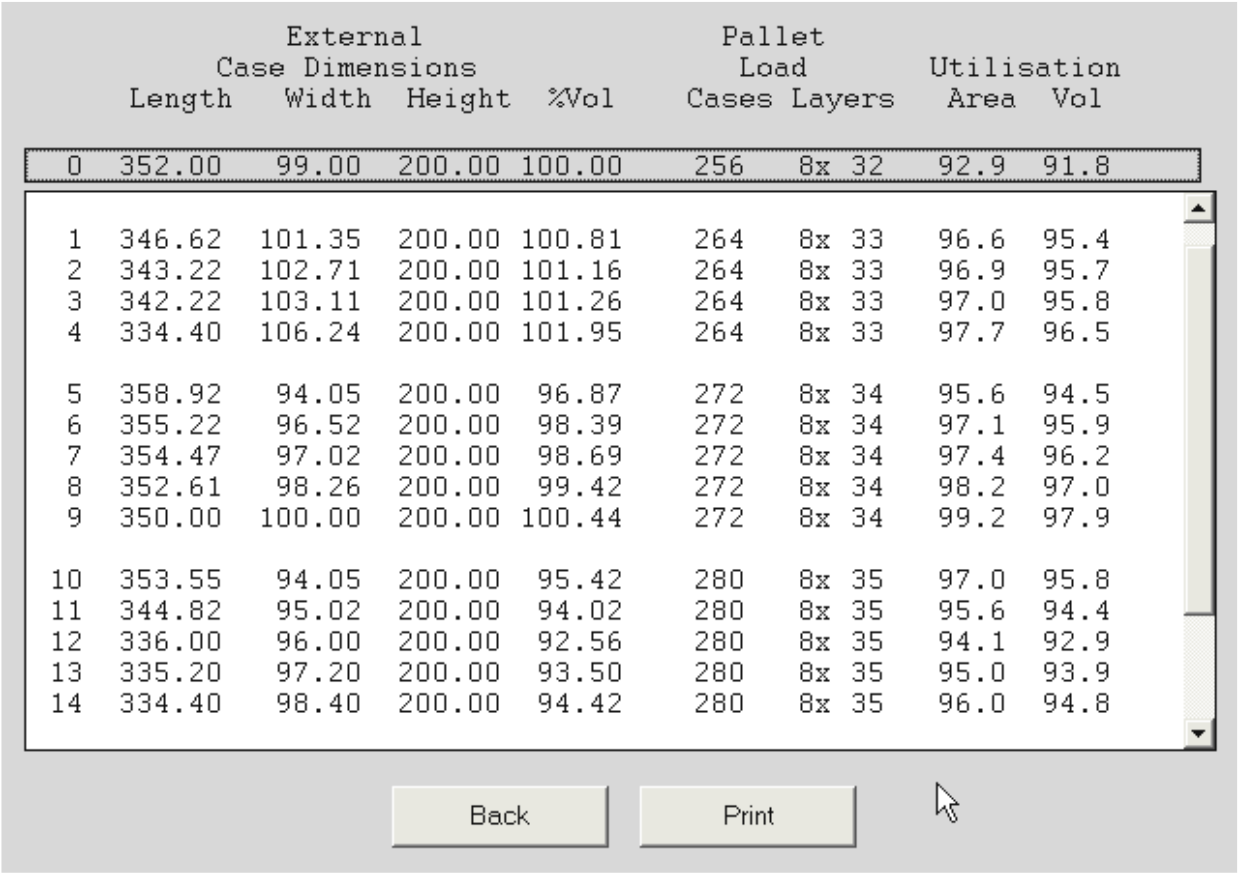
To use the module, we firstly **highlight the case entry we wish to examine** (here we just have just the one), and then select the **Do Better** option as below:



This results in **PALLETMANAGER** carrying out some unique and very powerful calculations and the display of a results screen.

We should make clear at this point that whatever actions you now carry out will **NOT** result in any changes to the data / results already entered or calculated, **the Do Better display will tell you what the impact would be if you made certain changes to the input data (e.g. the case size / primary size) on the appropriate input screen.**

The Do Better Results Screen for the problem we have been examining is shown below:



	External Case Dimensions				Pallet Load		Utilisation	
	Length	Width	Height	%Vol	Cases	Layers	Area	Vol
0	352.00	99.00	200.00	100.00	256	8x 32	92.9	91.8
1	346.62	101.35	200.00	100.81	264	8x 33	96.6	95.4
2	343.22	102.71	200.00	101.16	264	8x 33	96.9	95.7
3	342.22	103.11	200.00	101.26	264	8x 33	97.0	95.8
4	334.40	106.24	200.00	101.95	264	8x 33	97.7	96.5
5	358.92	94.05	200.00	96.87	272	8x 34	95.6	94.5
6	355.22	96.52	200.00	98.39	272	8x 34	97.1	95.9
7	354.47	97.02	200.00	98.69	272	8x 34	97.4	96.2
8	352.61	98.26	200.00	99.42	272	8x 34	98.2	97.0
9	350.00	100.00	200.00	100.44	272	8x 34	99.2	97.9
10	353.55	94.05	200.00	95.42	280	8x 35	97.0	95.8
11	344.82	95.02	200.00	94.02	280	8x 35	95.6	94.4
12	336.00	96.00	200.00	92.56	280	8x 35	94.1	92.9
13	335.20	97.20	200.00	93.50	280	8x 35	95.0	93.9
14	334.40	98.40	200.00	94.42	280	8x 35	96.0	94.8

We will now explain, step by step, what the results mean.

Firstly, many of the column headings in the above are the same as those used on the Screen 5 report presented earlier. The topmost entry (with a zero: 0) in the first column, is the case size that we highlighted before selecting Do Better, and the Cases / pallet figures etc all match those shown earlier. The one extra column (%Vol) will be explained below.

The information displayed below the existing case result are, for convenience, numbered 1,2 etc in sequence, and each line represents a case which has fairly similar case length and width dimensions (same height as the original), but fits more on each pallet layer.

Thus if we look at line reference 1, a case 346.62mm * 101.35mm would allow 33 (rather than 32) cases to be fitted on each pallet layer.

We do not expect you to measure (or construct) cases to this accuracy, the figures given are upper limits. Thus if you added even 0.01mm to either length or width then only 32 cases would fit! Thus an actual cases size might be 346*101 - but **not** 347*101 or 347*102.

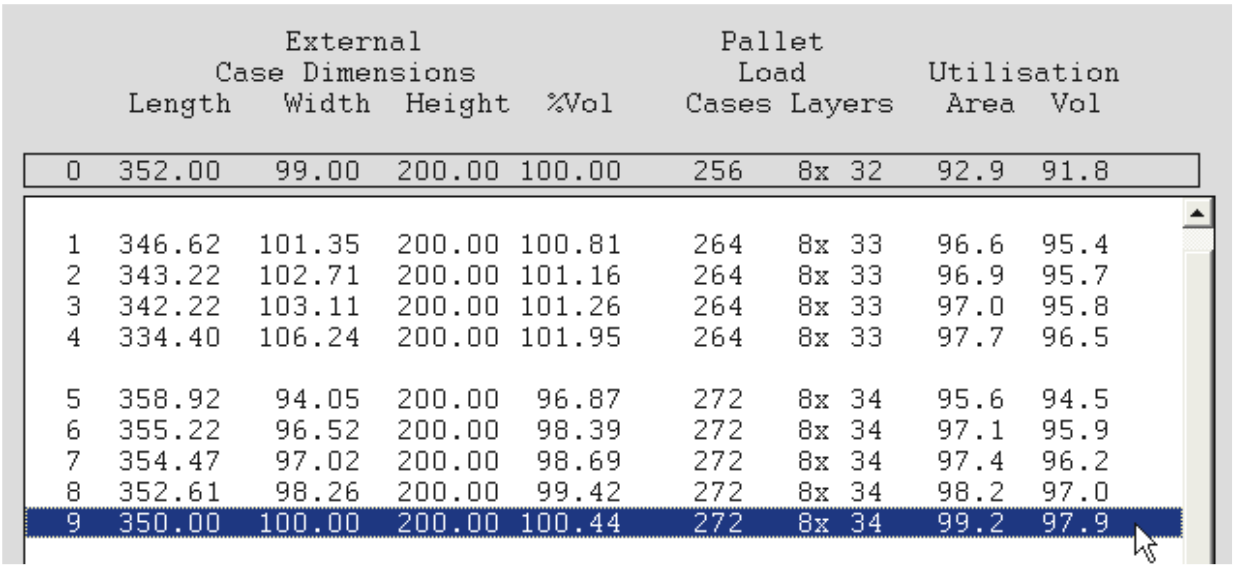
Thus a case 346mm * 101mm would fit 33 units / pallet layer. If you also look at the %Vol column for this entry you will note it has a value of 100.81% - this means that if you calculated the volume of the original case (352*99*200) and compared it with the case of size 346.6*101.3*200, then this latter case would be a little larger (by nearly 1%). Thus the %Vol figure indicates whether the 'new' case design has more or less volume than the original.

Looking at the full table of results you will note that the entries are grouped according to the number of cases / layer they can provide. The original case size fitted 32/layer, the results shown provide groups giving 33/layer, 34/layer etc in a scrollable table.

Within each group of entries (e.g. 33/layer), the results are sorted according to case length.

How YOU can use this information.

We started off our examination with a case of size 352mm * 99mm * 200mm high fitting 32 cases / layer and thus 512 cases / pallet. How can you use the above results to Do Better. Let us look at a subset of the screen as below:



	External Case Dimensions				Pallet Load		Utilisation	
	Length	Width	Height	%Vol	Cases	Layers	Area	Vol
0	352.00	99.00	200.00	100.00	256	8x 32	92.9	91.8
1	346.62	101.35	200.00	100.81	264	8x 33	96.6	95.4
2	343.22	102.71	200.00	101.16	264	8x 33	96.9	95.7
3	342.22	103.11	200.00	101.26	264	8x 33	97.0	95.8
4	334.40	106.24	200.00	101.95	264	8x 33	97.7	96.5
5	358.92	94.05	200.00	96.87	272	8x 34	95.6	94.5
6	355.22	96.52	200.00	98.39	272	8x 34	97.1	95.9
7	354.47	97.02	200.00	98.69	272	8x 34	97.4	96.2
8	352.61	98.26	200.00	99.42	272	8x 34	98.2	97.0
9	350.00	100.00	200.00	100.44	272	8x 34	99.2	97.9

Looking at the results in the **first grouping** (fitting 33/layer), all the results (1 to 4) have on this occasion, shorter case length values than the original (shorter by 6mm or more), and somewhat larger width values. With all these four entries the volume of the resultant case is larger than the original (%Vol larger than 100%). Assuming we were to ignore the decimal values we could consider cases of 346*101; 343*102; 342*103 or 334*106. [Remember, as mentioned above, that we cannot make 346.62 into 347 as this will not give the 33/layer result]

Looking now at the **second group of entries** (references 5 to 9, each fitting 34 cases / pallet layer). Once again these results are sorted according to case length, but on this occasion, entries 5 to 8 have case lengths which are longer than the original entry, and have widths slightly less than the original value. Each of entries

5 to 8 have a %Vol figure less than 100%, thus they have a slightly lower volume than the original case. Thus (if we ignore decimal values again), we could use case sizes 358*94; 355*96; 354*97 or 352*98, all of which would provide a solution giving 34 cases / layer.

The **final entry in this second group** (entry 9 which we have highlighted above), also fits 34 cases / pallet layer. It has a case length just 2mm less than the original, and has a case width that is 1mm more than the original. Overall its volume is slightly greater than the original case.

Thus we have identified a case size which is larger in volume than the original, and within 2mm of the size of the original, but which provides 34 cases/ layer rather than 32 cases/layer - a 6% improvement - a 6% reduction in palletisation and distribution costs - for just a 2mm change in a case size!

The actions which might follow this are, of course, up to you. **PALLETMANAGER** will **NOT** make any changes to the data input by you, but after carrying out the **Do Better** analysis you will be able to make informed decisions on any changes that might be feasible. The **Print** function available on the **Do Better** Results Screen allows you to take away the same information as displayed on screen for more detailed consideration.

As shown above it may well be useful to examine not only solutions in the first group immediately following the original solution (here fitting 33), but also other groupings lower down the screen. Suitable minor changes to the case size, as here, may jump from fitting 32 / layer straight to 34 / layer.

15.5 Do Better in Collation / Tertiary Modes.

As illustrated above, the **Do Better** analysis is based on changing the case size slightly to provide an improved packing. In Collation / Tertiary modes it works in an identical fashion to the above, but also reports to both screen and printer on the influence of the case size change on the dimensions of the primary unit. This assumes that no changes are made to the amounts of packaging material / allowance from that used for the original highlighted entry.

Extra columns are added to the right of the palletise mode **Do Better** Report which report the primary dimensions and, once again, the volume of the 'new' primary as compared with the volume of the 'original' primary. An example of this is shown below:

Primary Dimensions			
Length	Width	Height	%Vol
90.00	70.00	80.00	100.00
94.99	66.35	80.00	100.04
94.21	67.39	80.00	100.77
93.61	68.18	80.00	101.31
93.52	68.31	80.00	101.39
93.43	68.43	80.00	101.48
91.84	68.82	80.00	100.33
91.44	69.22	80.00	100.47
89.71	69.47	80.00	98.92
87.79	70.02	80.00	97.57
87.68	70.31	80.00	97.85
87.46	70.86	80.00	98.37
87.00	72.00	80.00	99.43
88.17	69.07	80.00	96.67
87.90	69.72	80.00	97.29
87.82	69.74	80.00	97.22
87.68	69.76	80.00	97.08

15.6 Do Better for Square products / boxes.

During the calculation of 'Better' case / product sizes it is quite possible that solutions may be output which have equal length and width dimensions. This will occur whether or not the original dimensions of the case / product were equal or not. Such solutions will be listed in the normal manner as above, but will be marked thus: [] in the right hand column of the display.

If the original case / product size you input into Palletise / Collation was indeed square then DO BETTER will, in addition to the standard analysis, determine and output additional square based solutions in addition to the regular solutions.

Once again those square solutions will be marked by a [] to the right of the display line.

15.7 Additional Information.

As described in the introduction to this section of the manual, the **Do Better** module complements the powerful **Fixed Volume** mode of operation which may be available to you (depending on your license).

As shown in the above results a change of just 0.01mm (far far beyond the realities of measurement and case construction accuracies), can change the quantities fitted / pallet layer. The **Do Better** report includes the decimal figures at both case and (in collation/tertiary modes) at primary level so that users can see exactly where the boundaries lie from solution to solution.

Notes:

- Whilst there **may** be groups of entries for each increasing value of cases / pallet, in some instances some values may be missing. This is not an error but is a function of the packing problem being examined.
- It is always worthwhile looking through the solutions, not just at those that provide one extra case / pallet layer but also at groupings providing an even better improvement. As shown in the above worked example a suitable solution may be found somewhat lower down the list of possible case sizes.
- The number of results / result groupings shown on a given Do Better report will vary between a handful up to 200 or more. The larger the case size the fewer results that are likely, with smaller cases yielding more results. The routine will normally work within dimensional changes of up to 2.5% or 5%, but if too few results are found in this tight range it will automatically expand its examination to provide you with a few more results.
- In a situation where the user has indicated that overhang or underhang applies then Do Better will always work with the load space after underhang / overhang amounts have been specified.
- It is technically possible in Collation / Tertiary modes for a primary unit shown in the report to have negative size!! Whilst we could obviously have eliminated the display of such values, such a display indicates that the packaging allowances you have made make up more of the case dimensions than the size of the product itself! Almost certainly an error in specifying the case allowances.

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SECTION 16 -

Trays, Tote Boxes and Slipsheets.

(Covers: Introduction, Packing a given tray / tote; Additional Challenges: Complex patterns and poor utilisation; Cost Entries; Multiple Tray/Tote Sizes.

16.1 Introduction.

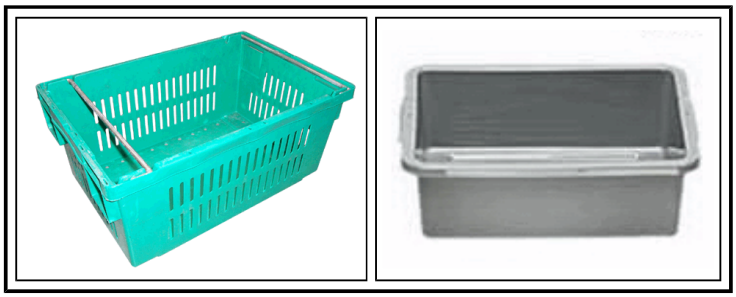
As well as dealing with the optimal packing of product onto pallets, PALLETMANAGER is an ideal tool to use when tackling any other problems where the objective is to pack a cubic space (e.g. tray, tote box or even a shipping container) with identical products. Only when you need to load a variety of **different** products into a given unit does alternative software such as our CARGOMANAGER product become more suitable.

The approach taken to solve tray, tote or slipsheet loading problems is essentially identical to that illustrated earlier (e.g. Section 3 - Guided Tour for Palletisation) and typically uses **Palletise** (or in some situations **CUBE**) mode. The only difference is the format of the reports produced by PALLETMANAGER which take account of the fact that a pallet is not in use.

We would strongly recommend you study Section 3 of the manual to gain a full understanding of points relevant to both pallet & tray/tote loading which are given a more summary treatment in the section.

The remainder of this Section illustrates the specific application of PALLETMANAGER for tray / tote box loading using **Palletise** and **CUBE** modes of operation. [With Slipsheets (essentially a thin card or plastic pallet substitute), the same logic applies as for standard palletising save for the pallet height]

The types of unit into which product is to be loaded are illustrated below, although in some companies the term tote is used for cardboard boxes of various sizes used for product transportation.



16.2 Packing into a given tray or tote box.

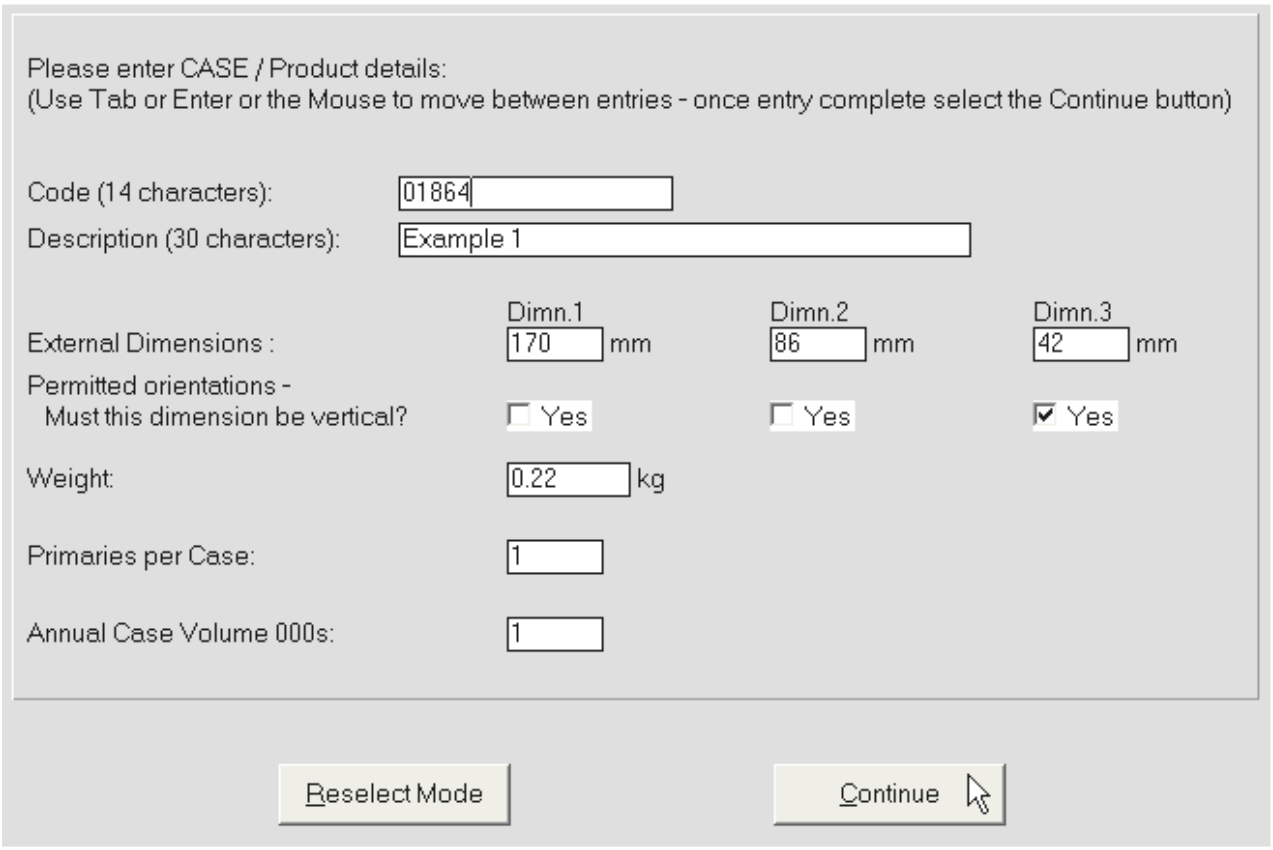
PALLETMANAGER Palletise mode will provide you with optimal solutions to problems where you need to pack identical products in layers so as to maximise the fill achieved. What is crucial, before tackling such problems, is to ascertain the **exact** internal dimensions of the base of the tray / tote and the maximum permitted loading height within the tray/tote, together with the weight limit applicable for contents. The range of tray sizes available (such as those used by leading food retailers) vary significantly from retailer to retailer and accurate **internal** measurements for units into which you will be packing are vital.

For the purposes of the next few examples we will assume the following tray (or tote) limits: Internal dimensions: 544mm * 352mm ; maximum loading height 172mm; maximum load weight 18kg.

We will assume that we need to examine the solutions for a number of different products, and in doing so over the next few pages we will illustrate various features of PALLETMANAGER that will be useful in practice when tackling such problems.

After starting PALLETMANAGER we select the **New Run** and the enter the **PALLETISE** mode of operation - ' Pack an existing product into a given load space [pallet, tray etc] in the most efficient way.'

In PALLETISE mode we first enter details of the product size - and here we will assume our first product is 170mm * 86mm * 42mm high and each weighs 0.22kg. The product must be packed with the height dimension vertical. A completed data entry screen is shown below:

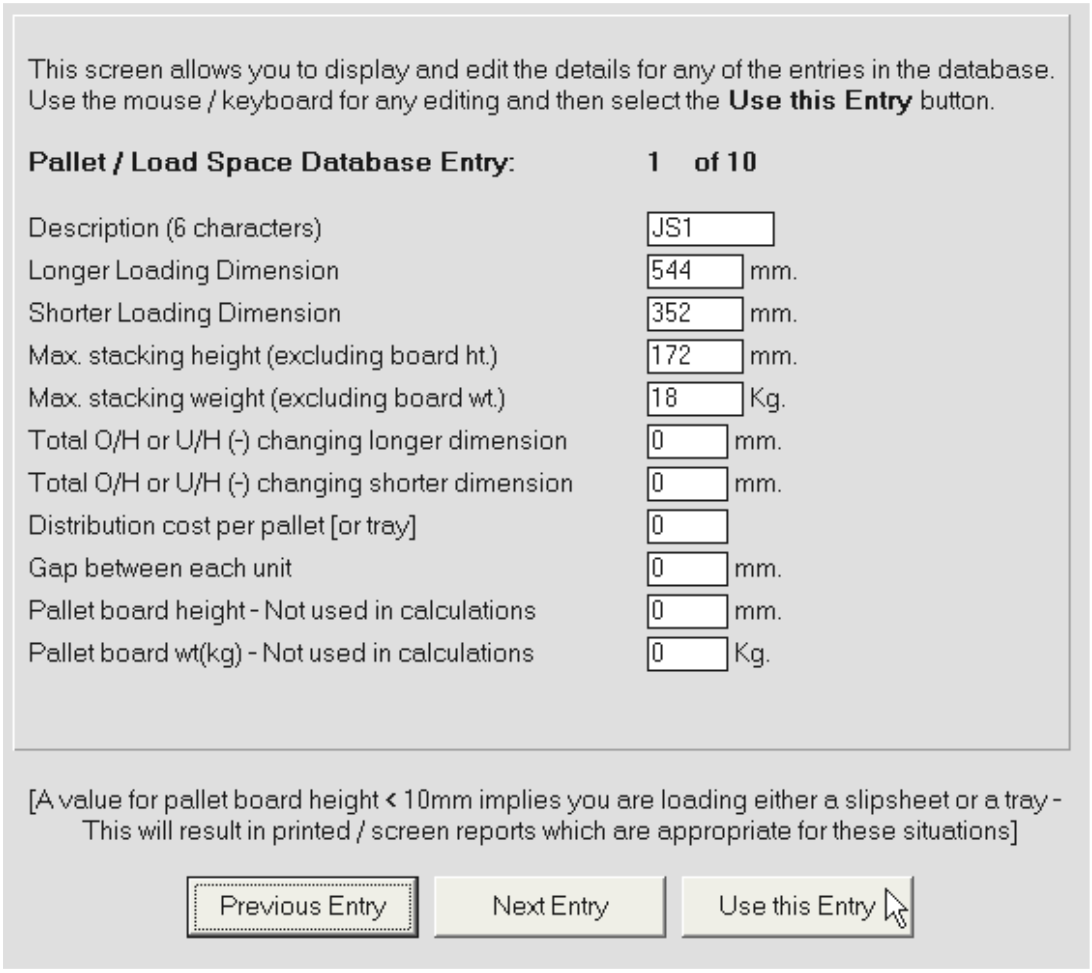


You will notice that the 42mm dimensions has been 'ticked' to show that it must be vertical. The two bottom entries are set = 1 - their default values. As will be described later these can be used to calculate an actual cost for the transport of a given quantity of product, but for the moment we leave these at their default values.

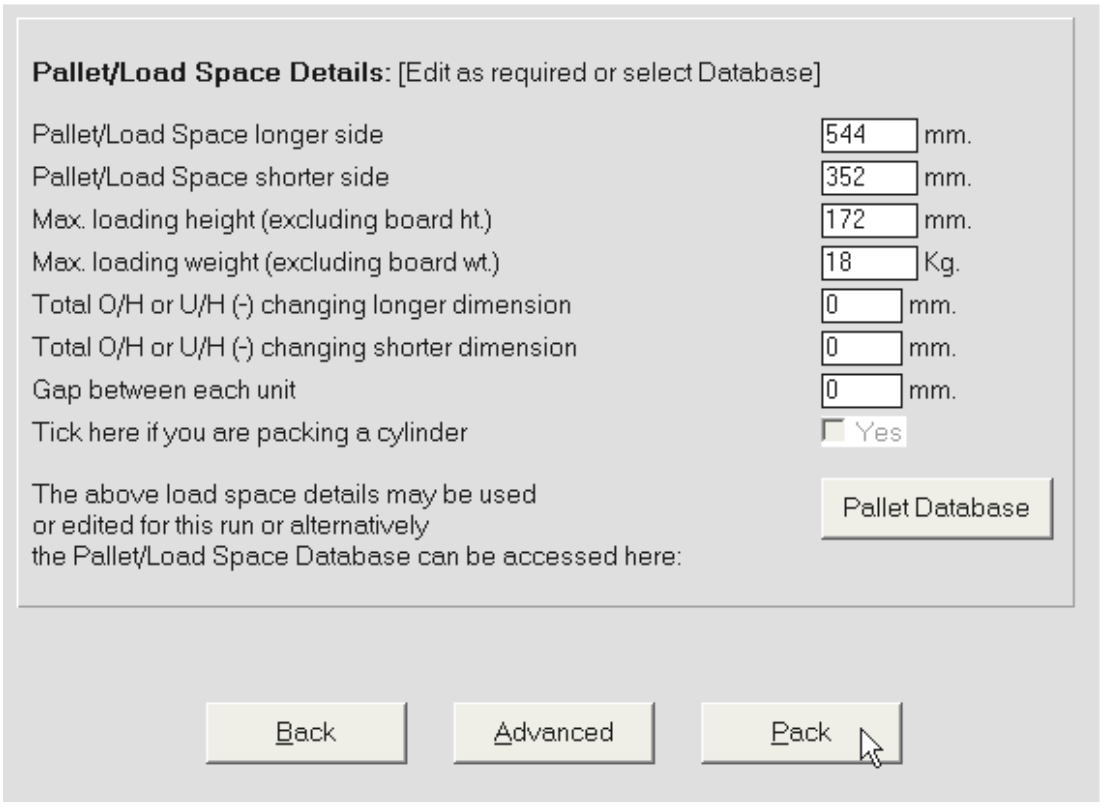
After completing entry of the product details we select **Continue** and the next screen contains details of the load space into which the product is to be packed.

**** When you first use the software the load space shown will NOT show the tray size detailed earlier** but will contain the default load space size - **Entry 1** in the pallet / load space database. To change this select **Pallet Database ****

The first of 10 entries for the database is then shown and, assuming your work will 'normally' involve packing trays / totes and not pallets **edit entry 1** to match the tray details detailed earlier as shown in the screen below. You could, of course, select other database entries and change as required. In time you will set up entries for other trays / totes as required into the other database entries.



Having made the necessary changes select the **Use this Entry** button, and the Load Space details screen will then be as below:



Having selected **Pack** PALLETMANAGER will then calculate the maximum number of product that can be

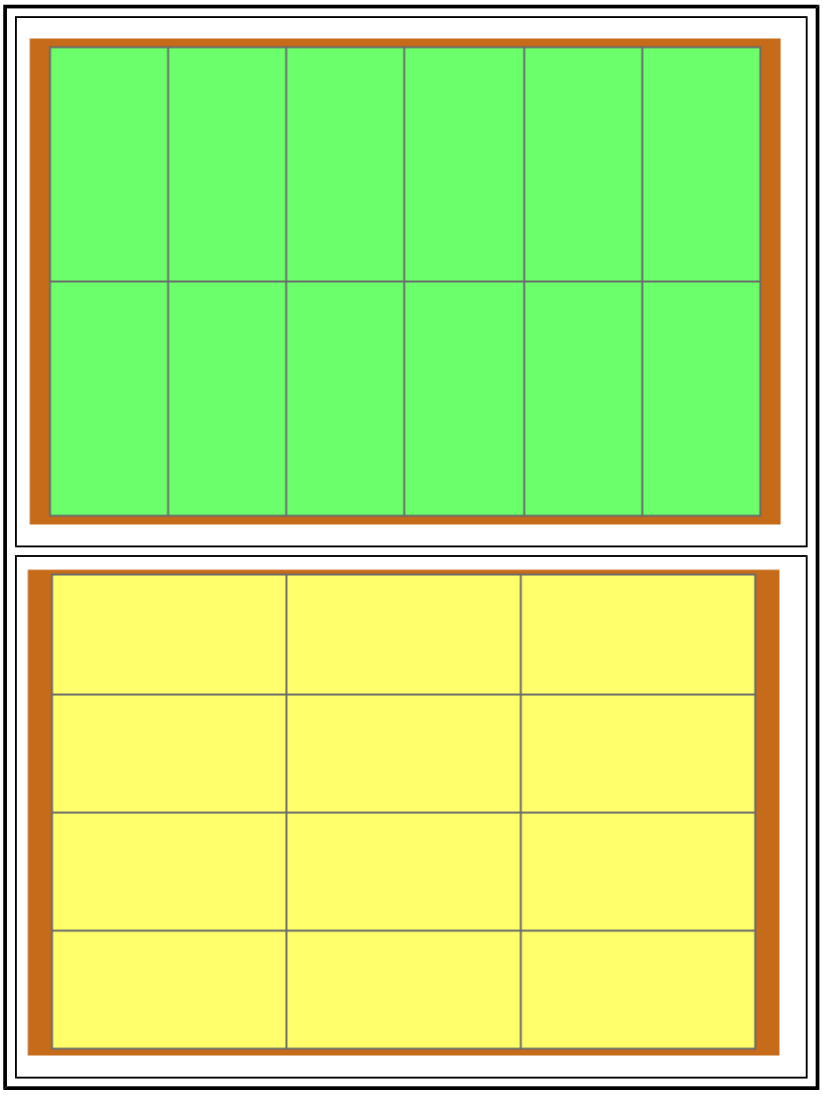
fitted into the given load space. This shows that a total of 48 units can be fitted, with 4 layers each accommodating 12. Part of the Tabular Results Screen is shown below.

This screen displays the 1 results ranked in order for Code:_
Load Space available: 544* 352* 172 ht.
Buttons such as Layout will calculate and display results for the highlighed entry.
Please highlight any line of the result you are interested in and then select the appropriate button.

Ref No	Extnl Dimensions		Colln	UNIT Matl	Wt.	TOTAL Units	Layer	% Fill Area	Vol	+Layer Ht.	Wt.
1	170	86	42	N/A	N/A	0.2	48	4x 12	91	89	38

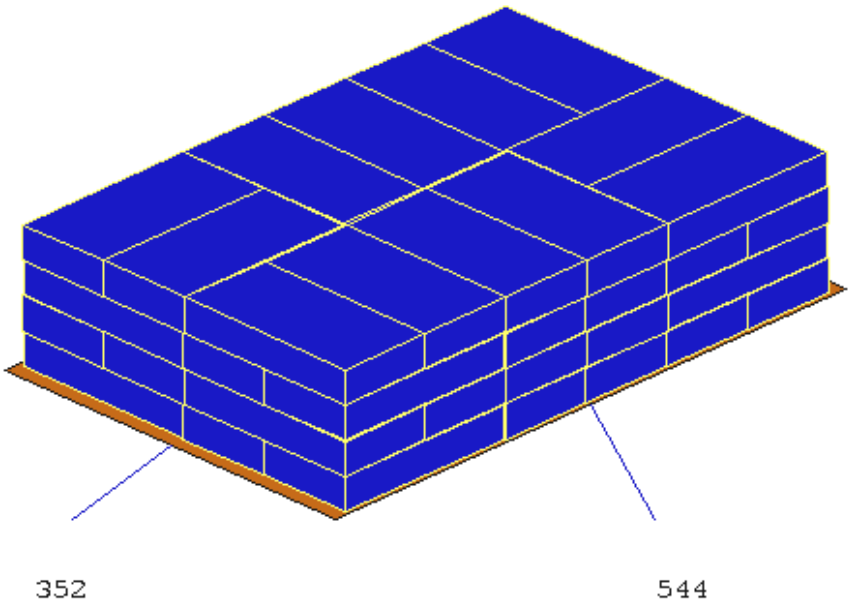
The figures in this table are explained in more detail in Section 3, but in summary show that 91% of the area of the tray/tote base are occupied by product, and that an extra 38mm of loading height would be needed for an extra layer of product to be fitted in the tray / tote.

For any given problem there may be many different ways of fitting the given number (here 12) in a layout, but sometimes there may only be one or two ways of achieving this number. Selecting **Layout** from the Tabular Results Screen (Screen 5), shows us that on this occasion there are 35 different ways for packing a layer of 12 product into the given load space. We can browse through these to see which is most suitable. The first two available arrangements for this product are shown below:



Either of the above might be suitable for tray loading, but in some situations (and most certainly for pallet /

slipsheet loading) a more complex form might well be required which provided some 'bonding' between each of the layers, such as that shown below as a 3D stack:



The procedure once you have selected a suitable layout follows that outlined during the examples in Section 3 - If all the layers in the stack are to be the same then you can just select **Print / View** and obtains on Screen or Printer reports of the proposed arrangement in both 2D and 3D form. If you have the Webbase (manual, Section 14) and/or STORE (manual Section 9) modules then you can also save these specifications for future recall / re-printing.

16.3 Additional Challenges.

In the above example there were a wide range of arrangements which could be used for packing the given product into the tray / tote, and the area utilisation (at 91%) was reasonably good.

We now consider the following two situations:

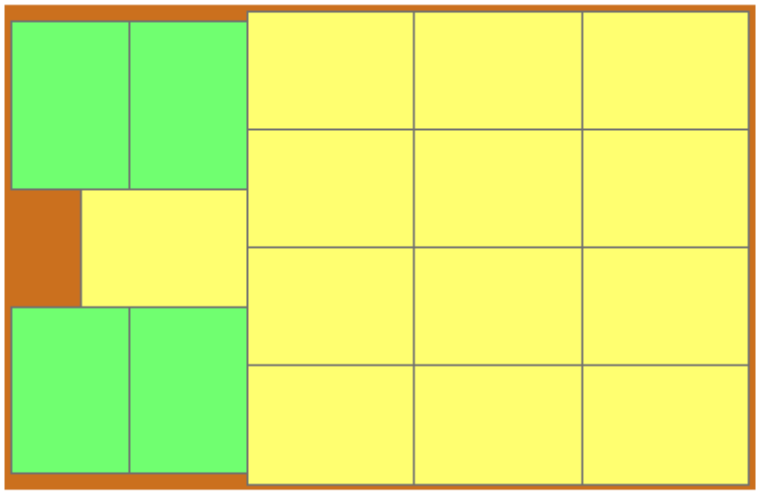
(a) What if the arrangements available are all too complex to use?

(b) If the results are very poor and we need to consider a possible change to the product size?

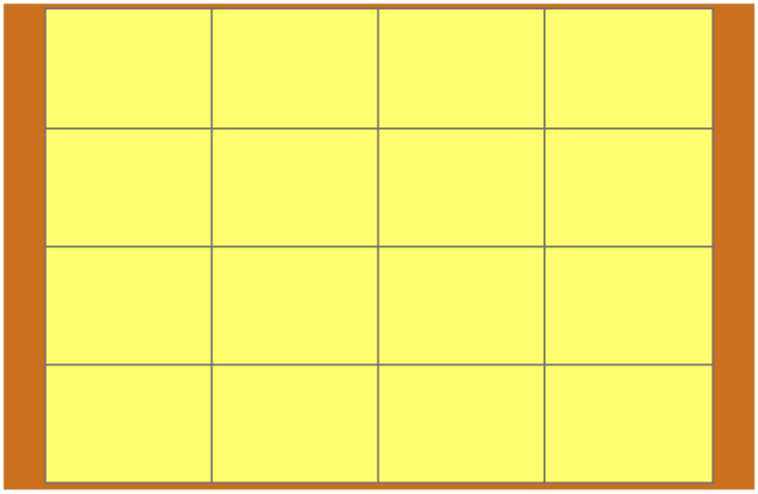
16.4 Arrangements too Complex to Use?

If we were to perform a packing of a unit 121mm * 86mm * 42mm high into the same tray/tote size as considered previously we would obtain an optimal solution fitting 17 units on each layer. This is the **best** that can possibly be obtained and gives a 92% fill on the base of the tray/tote.

When we view the layouts available (there are 5), we see that they may be too complex to adopt in practice. What is probably the simplest of the available arrangements is shown below:



What if this in not acceptable. Unfortunately the answer is that there is no **simple** way of fitting 17 and we may therefore need to reduce the quantity fitted to 16. This can quickly be done from Screen 5 - the Results Summary Screen - by selecting firstly the **Advanced** button and then the **Subopt** button. This reduces the number you wish to fit to 16 and you can once again select **Layout** to get layouts which now fit 16. The first solution obtained (one of 27) is shown below.



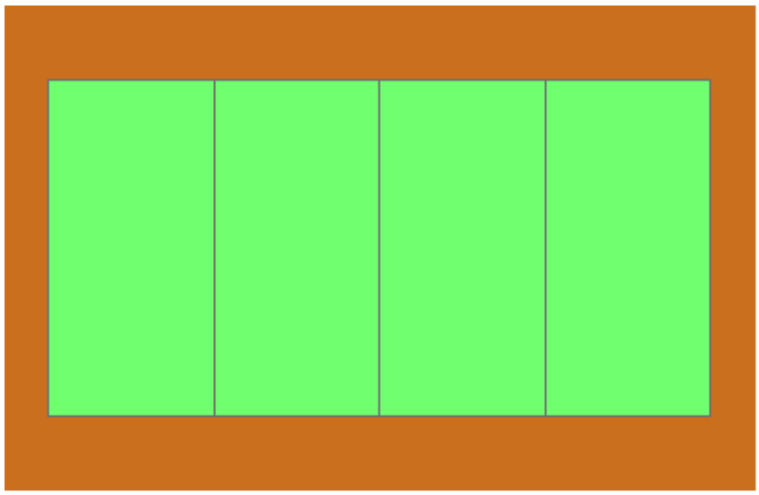
Thus PALLETMANAGER can adapt to meet the practical situation where the 'technical' best does not meet the practical needs.

16.5 Results Very Poor - Can we Improve Design?

PALLETMANAGER will ALWAYS give you the best solution for a given problem. However there will be instances where the best solution that can be achieved results in a very poor tray / tote utilisation. PALLETMANAGER has a number of tools available to help you make what may be very small changes to the sizing and yet achieve major load improvements.

Consider the packing of units 245mm * 120mm * 42mm high into the tray / tote size considered earlier.

If you carry out this analysis you get an optimal (best possible) solution which fits 4 units on each layer and a total of 16 units / tray / tote. The (very poor) solution - one of a number fitting 4/layer - is shown below:



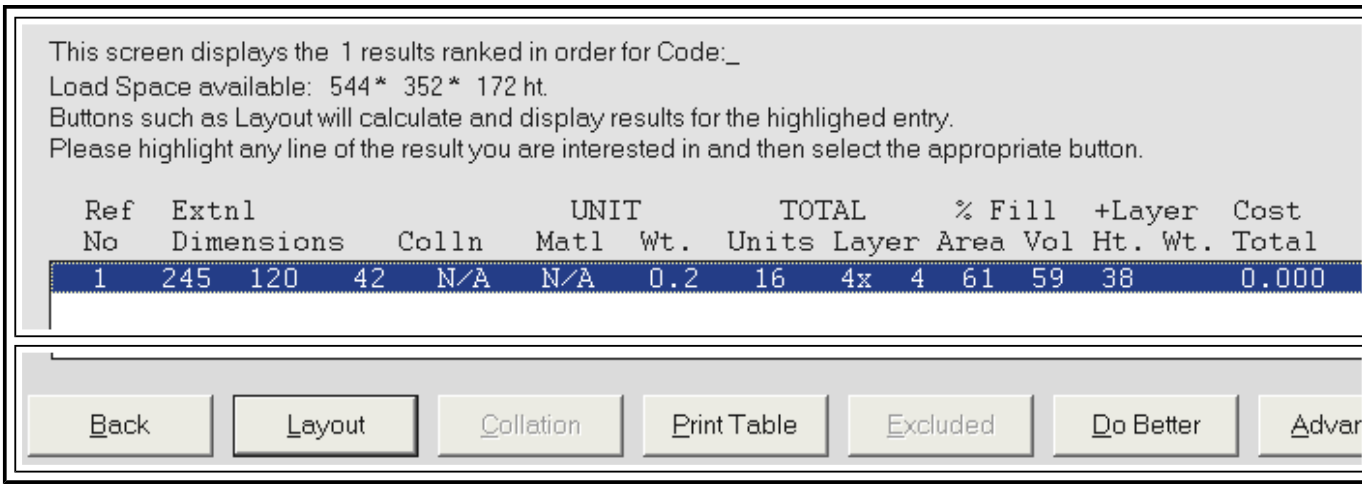
We must once again emphasize that there is **no way at all** that extra / layers can be fitted.

Is there any way in which we can fit more by making **small** changes to the case dimensions?

PALLETMANAGER has two tools which will help solve this. If all the 3 dimensions of the product could be changed slightly then the Fixed Volume toolkit (Section 7) could be used. This is designed to help design products to make best use of height, length and width of the load space whilst (normally) retaining the volume of the product.

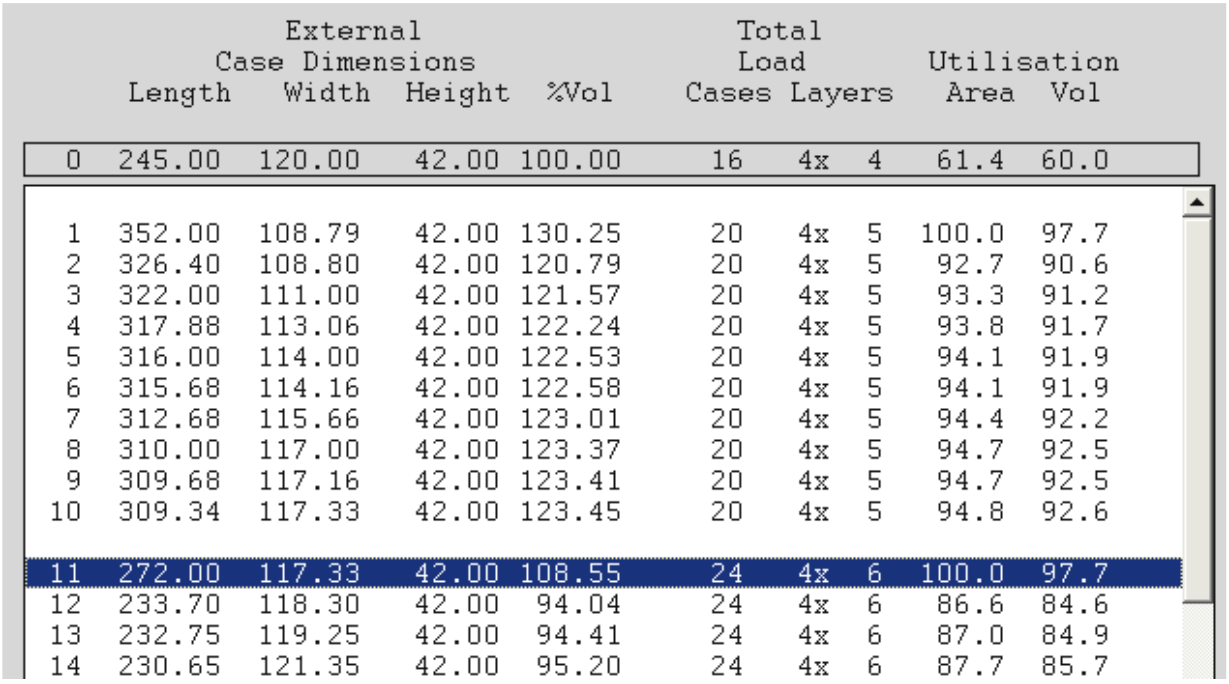
Here we will use a rather simpler - but equally powerful tool - the **Do Better** module. This is described in detail in Section 15 of the manual but is illustrated brifly below:

Once again we start from the Results Summary Screen (Screen 5) this looks as below:



The **Do Better** option is shown as a button towards the bottom right.

If you select this then, after a few seconds, a new results screen is displayed as shown below:



	External Case Dimensions Length	Width	Height	%Vol	Total Load Cases	Layers		Utilisation Area	Vol
0	245.00	120.00	42.00	100.00	16	4x	4	61.4	60.0
1	352.00	108.79	42.00	130.25	20	4x	5	100.0	97.7
2	326.40	108.80	42.00	120.79	20	4x	5	92.7	90.6
3	322.00	111.00	42.00	121.57	20	4x	5	93.3	91.2
4	317.88	113.06	42.00	122.24	20	4x	5	93.8	91.7
5	316.00	114.00	42.00	122.53	20	4x	5	94.1	91.9
6	315.68	114.16	42.00	122.58	20	4x	5	94.1	91.9
7	312.68	115.66	42.00	123.01	20	4x	5	94.4	92.2
8	310.00	117.00	42.00	123.37	20	4x	5	94.7	92.5
9	309.68	117.16	42.00	123.41	20	4x	5	94.7	92.5
10	309.34	117.33	42.00	123.45	20	4x	5	94.8	92.6
11	272.00	117.33	42.00	108.55	24	4x	6	100.0	97.7
12	233.70	118.30	42.00	94.04	24	4x	6	86.6	84.6
13	232.75	119.25	42.00	94.41	24	4x	6	87.0	84.9
14	230.65	121.35	42.00	95.20	24	4x	6	87.7	85.7

The line 0 of this display (245*120*42), shows the current solution, 4 layers of 4 fitting in total 16 units / tray or tote.

The lines below this are various alternate unit sizes which fit more units / layer and per tray / tote, this being achieved through changing the length and width.

A full explanation of the process is given in Section 15.

Thus it we packed a unit 352*108.79 we would fit 20 units, whilst if we packed the entry we have highlighted - 272*117.33 we would fit 24 units.

When using **Do Better** you should browse through the results shown and find those that are close to your current unit size - the example shown has a width just 3mm less than we had initially (117 rather than 120) and yet fits 50% more even if using a length dimension 27mm greater than that input.

Do Better will NOT change the data you have input but will highlight how improvements might be achieved.

16.6 Cost Entries during Palletise.

During the examples described above (16.2 onwards) we always have used the default values (1) provided for two of the data input values - Primaries / Case and Annual Case Volume. The relevance of these values is normally only for the loading of cases onto pallets, but they could be used, as described here, to provide costing for tote based or tray based loads.

In a **pallet** loading situation we might want to convert the quantities of product we are shipping / year into an equivalent number of pallet loads, and then convert this to a cost based on the average cost of storing and transporting a pallet load. This average cost is held in the Pallet / Load Space database for each entry.

In tray / tote loading we **could** translate the quantity of product transported / year in the tote/tray into a quantity of trays / year and place a cost per tray/tote figure into the appropriate Pallet / Load Space database entry. In the examples given above the cost value held in the database was set = zero (see page 3 of this Section).

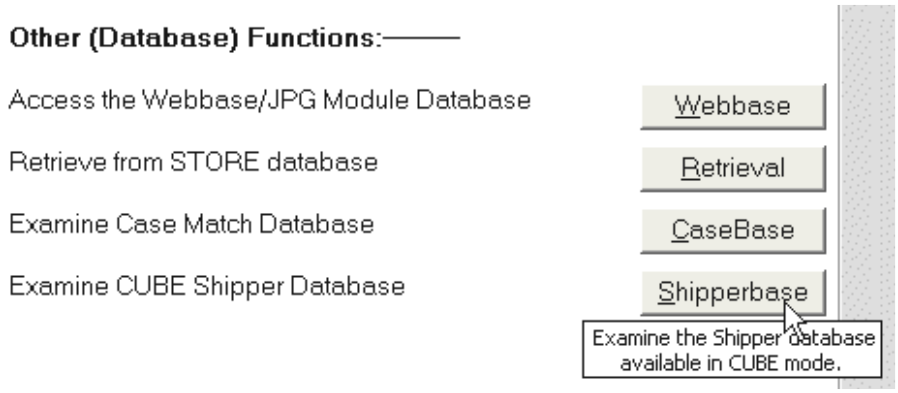
16.7 Packing Multiple Sizes of Tray/Tote.

The **Palletise module** of PALLETMANAGER is designed to tackle problems where the size of the load space (pallet, tray, tote, container etc) is known and fixed. However there are situations where one may be interested in the relative performance of several different sizes of load space for packing a given product. This might be comparing which of a number of different tray sizes is best used for a particular product (in terms of % utilisation of the cubic load space), or to determine which of a larger set of standard tote boxes (say 50+ different sizes) is best used for a particular product. Once again the criteria would be the % fill achieved, subject in most instances weight limits.

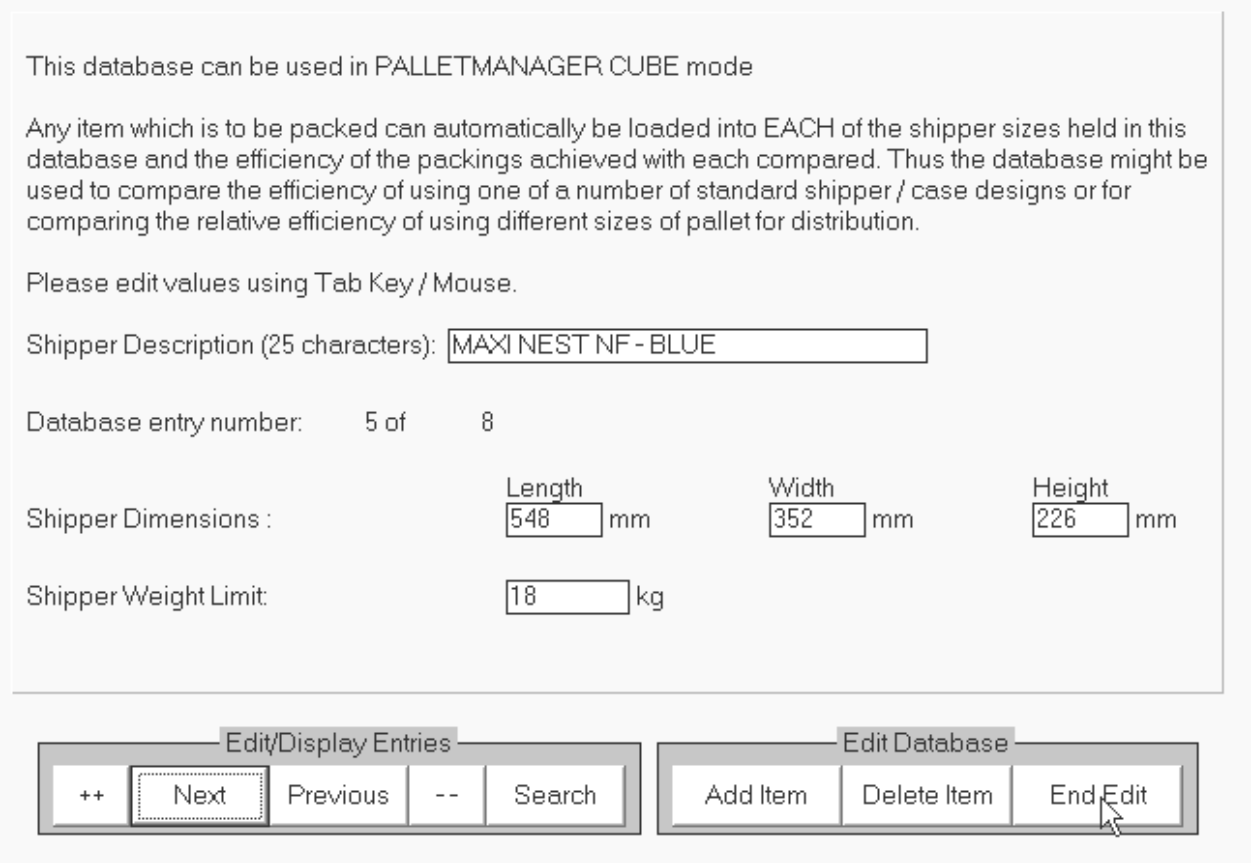
The CUBE mode of operation (as with Palletise selected from the New Run Menu), is a tool specifically designed to deal with such problems. It differs from Palletise in two distinct ways. Firstly it has its own link with what is termed a 'Shipper database' - a database which you can provide with up to 600 different tote / tray / box sizes and weight limits. Whenever the CUBE module is run a product can be packed into each of these shipper sizes and the best 30 solutions (i.e. the highest utilisation trays / totes etc) are then identified. Secondly, as well as allowing the product being packed to always be placed with a particular dimension as vertical (as with the earlier examples), it also allows the user to remove this restriction and, in doing so, allow any combination of

Full details of the CUBE mode are given in Section 8 of the manual, but below we illustrate briefly what might be involved for those tackling tray or tote packing.

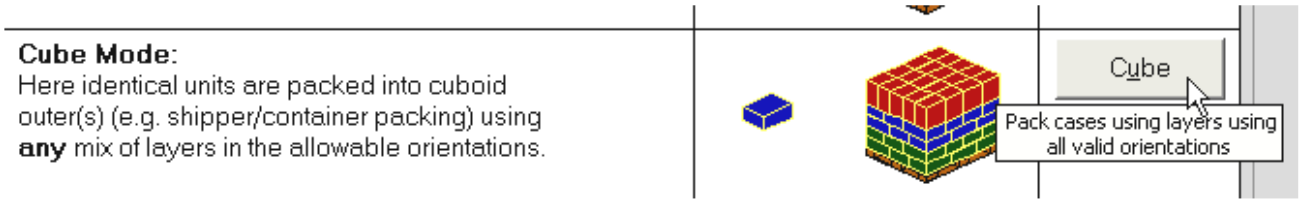
Step 1: The CUBE Shipperbase is entered from the Opening Screen:



Step 2: Database entries are made for each tray / tote / shipper size - up to 600 can be held in the database.

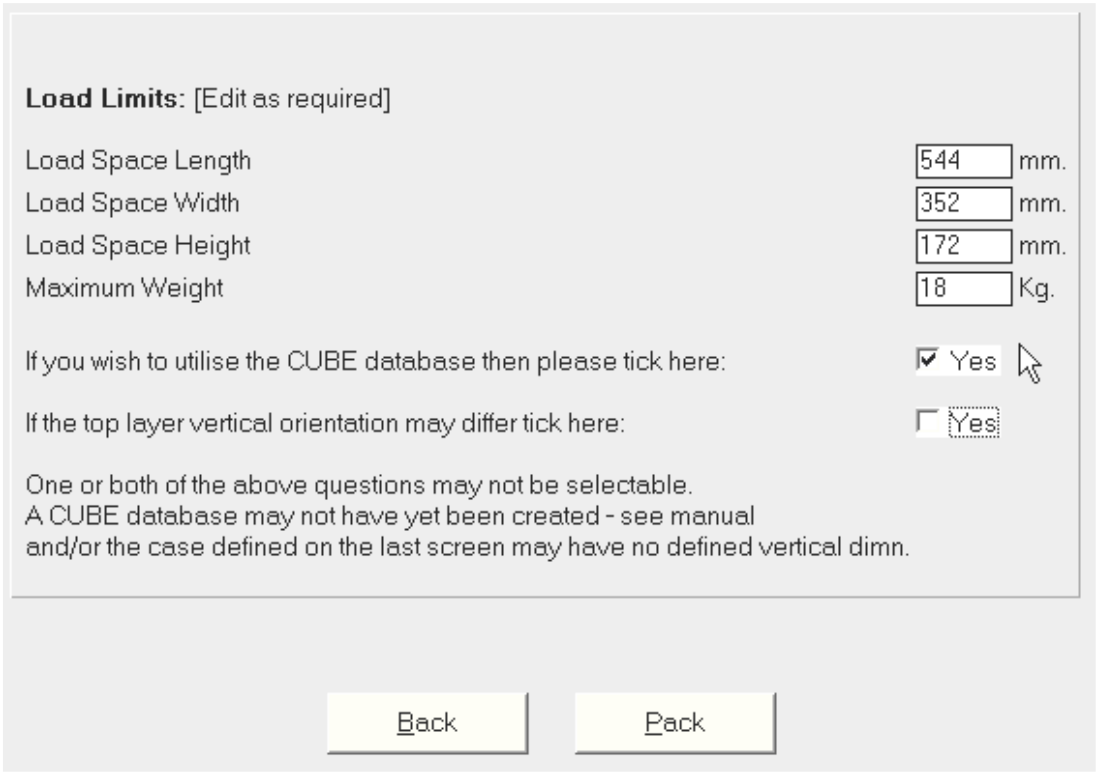


Step 3: From the Opening Menu New Run is selected and then CUBE mode selected.

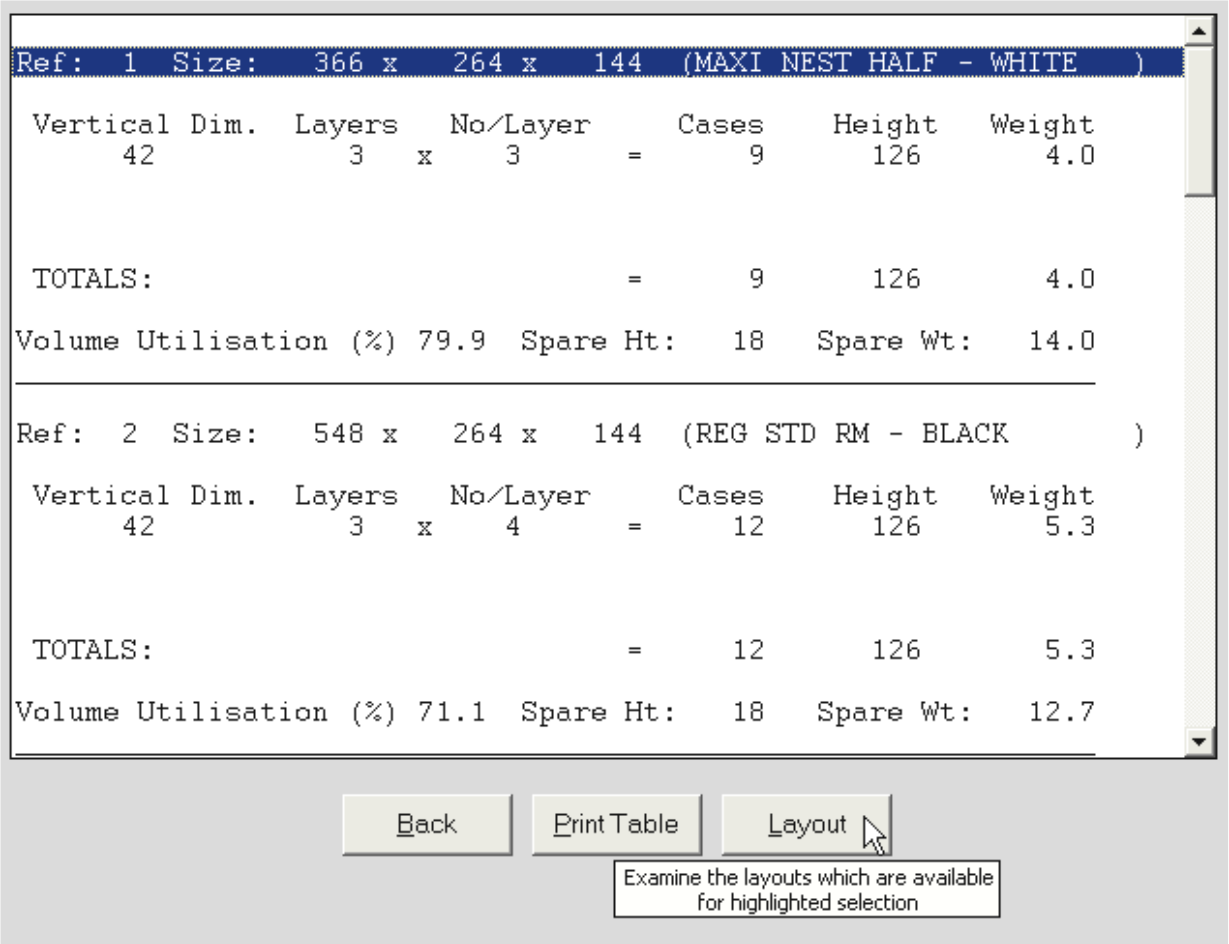


Step 4: Details of the product to be packed are entered in the same way as in Palletise mode - we entered a size of 245mm * 120mm * 42mm (the product which earlier gave us a poor packing in the tray / tote size specified at the start of the Section.

Step 5: After entering the product size we are then faced with the Load Limits screen: Details of one of the database entries is shown (the first alphabetically), and by ticking the appropriate box all the others will be examined.



Step 6: Pack is selected and a results screen is subsequently displayed:



This has ranked the performance of the various database entries and lists the top 30 results ranked according

the Volume Utilisation. This table can be printed or the required entry can be highlighted and pattern(s) available to achieve the packing can be displayed.

Thus the performance of various tray / tote / shipper sizes can be compared for the given product.

Once again full details on the CUBE mode of operation can be found in Section 8 of the manual.

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SECTION 17

GLOSSARY OF TERMS

Alternate Collation.

This term refers to the (optional) selection (on Screen 4) of alternate numbers of primary units which are to be combined within a secondary case, with all units being arranged in the same orientation.

See Collation (below).

Case

The final unit which is to be palletised. This may be defined by the user (in Palletise mode) or may be constructed from primary / sub-primary units.

Case Constraints.

When a secondary case has been sized by the Collation module the external dimensions will be compared with constraints that will exclude unsuitable cases from the results.

Constraints are specified by you for each packaging style on the Packaging Style screen (Selected from Screen 3) and they can be changed by amending the details shown.

Case Sizing.

The external dimensions of a CASE are calculated for a collation of PRIMARY UNITS as follows:

Base:

the collation base dimension

\+ material thickness x No. of thicknesses

\+ total of gaps between each PRIMARY UNIT

\+ constraint gap allowance + s/wrap and seal allowance (length only)

Height:

the collation height dimension

\+ material thickness x No. of thicknesses + headspace.

The result is rounded up to the nearest millimetre on certain reports.

Collation

The arrangement of primary units within a secondary case with all the units oriented in the same direction. The number of primary unit tiers within the case is governed by the stability constraint and by any restriction imposed by the user on the number of tiers which can be used. This value is specified in the packing style

screen. Each tier will be identical to the first. A three dimensional diagram may be seen on the computer screen if required and the collation for each case is printed on both the 'Summary of Results' and the 'Palletisation Specification' reports.

Collation Tiers.

The number of layers of primary units within a secondary case.

PALLETMANAGER will investigate every collation within the size, stability and number of tiers constraints imposed by you on the packaging style specification.

When the FIXED VOLUME module is being used the number of alternative collations that will be examined can be further reduced by entering the maximum number of tiers that you will be prepared to consider.

Conveyor Width and Radius.

When generating secondary units for a given number of primary cases, details of the conveyor to be used can be entered and held on the conveyor details standard value file. A width of zero indicates that no conveyor is in use.

PALLETMANAGER will not attempt to palletise a secondary unit which will not travel along the conveyor or around its tightest curve without overhanging.

Elevations.

A printer report available in PALLETISE and Collation modes which provides views from all four sides of the pallet stack.

Excluded Cases.

When PALLETMANAGER has sized a case for a particular collation the external dimensions are checked against the pack constraints for the selected style of packaging. Where any constraint is exceeded, this case will be excluded from analysis.

Details of excluded cases can be viewed from Screen 5.

Flip Over Image.

Intermediate layers of cases are a flip-over image of the first layer (in an axis parallel to the pallet length), to provide interlocking.

Grid Packing.

This term is used to represent a packing in which the items packed (e.g. Cylinders) form distinct rows and columns within the collation. (See Nesting)

Height/Base Stability Ratio.

This is a pack constraint that will exclude any collation where the external height dimension of the secondary case is greater than the smallest base dimension multiplied by the value held in the packaging style record.

Horizontal.

An option on Screen 6, the two / three dimensional pallet layout display, allows the placement on the pallet to be adjusted horizontally (on the screen) so at to 'even out' any gaps in a layout. A similar option to move vertically (on the screen) can also be selected. The effect of any movements applied can be removed by reselecting the appropriate layout number

JPG files.

A common graphics format used when displaying images on an Intranet / Internet. Can be viewed using a web browser such as explorer. Also used in the display of a company Logo on reports (see Appendix 1) or for display of product images in Collation mode (Section 6)

Layout.

An arrangement of a single layer of cases on a pallet or within a tray..

PALLETMANAGER uses a variety of techniques to develop pallet loading patterns which make the **maximum** use of the pallet loading area. The number of layouts which provide this maximum utilisation will depend upon the shape and size of the case base and on the load area of the pallet. Sometimes there will be only one possible layout but at other times there may be hundreds (usually if the case base is nearly square).

The choice of an acceptable layout depends upon your own requirements, and the range offered by PALLETMANAGER will meet most needs.

Mirror Image.

Intermediate layers of cases are a mirror image (in an axis parallel to the pallet width) of the first layer to provide interlocking.

Mixed Layer Mode

When selected allows for the inter-mixing of layers of different types on the pallet. See Section 11.

Nesting.

An arrangement of cylinders in which adjacent items do NOT form distinct rows and columns. A detailed description of the types of nesting pattern is given in Section 10.

Overhang - Actual

Layouts are centralised on the pallet so that the actual overhang on a particular edge will be half of the calculated total displayed on the Layout Screen (Screen 6).

Overhang - Long Side.

This entry (on Screen 3) is the TOTAL amount by which the load area length considered by PALLETMANAGER exceeds the larger pallet dimension.

Overhang - Short Side.

Is the TOTAL amount by which the load area width considered by PALLETMANAGER exceeds the shorter pallet dimension. In either case a negative sign indicates dimension(s) less than the stated pallet length and/or width.

Overhang Maximum.

The maximum amount by which a case layout can be allowed to exceed a pallet edge dimension. As layouts are centralised the maximum should be twice the amount allowed for one edge.

Packaging Material Area.

The area of packaging material in square metres is calculated according to the equations given in Section 4 of this manual.

Palletisation Specification.

The printout produced at the end of your PALLETMANAGER investigation which can be used as all or part of the specification issued as an instruction to the loading department.

PDF Format.

A format devised by Adobe Systems for holding and displaying textual and graphics material.

Percentage Fill.

The 'Summary of Results' report shows the percentage of load area and pallet volume filled by the secondary case. The total area and volume of the pallet (including maximum allowable overhang) is used for this calculation.

Primary Unit.

Any cuboid or cylindrical shaped item that has to be packed into a secondary case.

Cylindrical shapes must be expressed in three dimensions and the system will assume that these units are cuboid. "Nesting" of cylindrical units is also catered for. The primary units must be identical.

Same.

This option, displayed on Screen 6, the two and three dimensional layout display, allows the user to select a stack made up of identical layers. **Secondary Unit.**

The outer case sized by the Collation module or an existing case that you wish to palletise.

Sub-Primary

The term used in Tertiary mode for the smallest individual unit. These are collated to form primary units, then collated again to form the final case.

Tertiary Mode

The two stage collation of sub-primary units to form a case. Sub-primaries are firstly collated to form a primary, and then collated once again to form the case.

Ti-High

Refers to the number of boxes or cartons stored on a layer / tier (Ti) and the number of layers high these can be stacked in the pallet (Hi)

Top-Layer Option.

When selected, this permits the top layer of the pallet may consist of cases placed on their side.

Tray or Tote.

Aside from the use of this term for designs of cardboard trays used to hold product, these terms are used for units (such as those popular in major stores) used to hold product in stackable re-usable units.

Underhang (actual).

Layouts are centralised on the pallet so that the amount by which the layout is inside the pallet edge will be half of the calculated total displayed on Layout Screen 6. Underhang is shown as a negative value.

Underhang (minimum)

The minimum by which a pallet layout can be allowed to sit inside a pallet edge. As layouts are centralised the minimum should be twice the amount allowed for one edge.

Webbase.

A recently introduced feature whereby palletisation specifications may be made available for viewing by others on an Intranet / Internet or CD, with access being via their web browser.

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APPENDIX 1 -

TECHNICAL INFORMATION

(Covers: Introduction, Cut & Paste and JPG / web files, Slow Printing, Store Intranet use, Merging Store databases, Style editing warning, Slow screen update, On-top Windows, Dead Windows processes, Alternate Storfile location, Moving between machines, Webbase and Explorer 6, Cylinder Modes, Alternate Manual Formats, Single Use Protection, Screen Font Size, Display of your logo on Reports, Wide Screen Displays, Alternate Palletisation report Format / Ti-High report , Mini-Collation and Splash Screens).

A1.1 Introduction.

During the development and testing phases of this release of PALLETMANAGER, a very substantial effort has been applied to ensure that the new screens and documentation match in arrangement and terminology earlier releases, thus making the transition to the new release all the easier. All data and user files from earlier releases are compatible with this release.

Our web site (www.goweralg.co.uk) contains extensive support information which is naturally updated on a regular basis. If software bugs are discovered then those users on maintenance who are likely to be affected are naturally contacted and if appropriate updates provided. All our software development is carried out on Windows XP professional systems, but a routine part of our testing is (naturally) on Windows 98, Windows 2000, Windows Vista and Windows 7 machines, the latter being the main platform on which development takes place.

A1.2 Cut and Paste and .JPG / Web files.

On all graphics display screens two image copy operations are supported:

On all such screens it is possible to cut part of the screen image onto the clipboard. This is done by positioning the mouse at one corner of the area required and then depressing the left mouse button and stretching the rectangular area to enclose the region - then release the mouse button. (A non-trivial sized region must be selected). A screen message indicates that the action has taken place is then displayed.

When displaying any of the PALLETMANAGER report screens **two** cut (& paste) operations are available. One (described immediately above) copies using the left mouse button a selected rectangular area to the clipboard. The other copies the **complete printer page** (i.e. 2 screens worth) to the clipboard. This is activated by simply pressing and releasing the right mouse button whilst viewing any on-screen report. Once on the clipboard the image can then be pasted directly into other Windows applications.

It is also possible to **create .JPG graphics** files using the new **Webbase** module and using buttons available on the print / view screens - this is covered in detail in **Section 14** of this manual. Once again we would emphasize that this copies the complete report page as printed and not just the top / bottom half as displayed.

A1.3 High Quality Printing / Slow Printing.

The graphics reports output by PALLETMANAGER typically require some 10 to 20 seconds to output on a modern laser printer. Some older Windows printer drivers, whilst producing very high quality output, can take some time to achieve this! A graphics oriented package such as PALLETMANAGER can on occasion benefit from use of one or both of the options below.

- Selecting a lower print resolution from your Windows printer configuration

- Use a 'simpler' generic printer driver for more modern Laserjets. This latter approach has seen significant reductions in print times.

A1.4 The STORE Database.

As described in Section 9 the STORE database holds details of palletisation specifications in a numeric format which can be recalled by the STORE module for re-printing / viewing / re-running. The format used means that to STORE details of (say) 2000 specifications will require in the region of 2Mb of disk space.

A1.5 Merging STORE Databases.

In situations where multiple users work with PALLETMANAGER specifications our recommended procedure is that a single user / machine should be used for STORE database updates, with other users being provided with updated STORE database files as required. Transfer of the 2 or 3 files beginning with 'STORFILE' will achieve this.

It **may** be possible to merge the STORE databases produced on 2 different machines if the following procedure is followed carefully. For reasons discussed below this is not a recommended route.

Each machine will have in the PALLETMANAGER installation folder either 2 or 3 files named **STORFILE** - STORFILE.DAT ; STORFILE.IDX and STORFILE.DEL (the final file may not be there). The first stage in merging files is to carefully make security copies of all such files off both machines - ensuring that they are clearly labelled. All files are important but the .DAT files are critical.

With the security copies verified and stored safely choose **one** machine to work on and carry out the following actions:

- Delete the files STORFILE.IDX and (if it exists) STORFILE.DEL off that machine leaving the .DAT file in place.
- Rename the file STORFILE.DAT on the machine you are working on as STORFILE.1
- Put the STORFILE.DAT off the 'other' machine onto the machine you are working on (into the same directory / folder as STORFILE.1).
- Rename that STORFILE.DAT as STORFILE.2

Thus at this stage you have the 2 STORFILE files together on the same machine - STORFILE.1 and STORFILE.2

- Go to a DOS / Command prompt.
- Ensure that you are in the correct folder for the 2 files which you need to merge. If this is the default c:\pmnt then issue the command:

  CD C:\PMNT (Enter)

- and then issue the following command:

COPY STORFILE.1 + STORFILE.2 /B STORFILE.DAT (Enter)

- Start up PALLETMANAGER and select (from the front menu) the STORE database. If all is well the enlarged file will be read and re-indexed and displayed. You may receive error messages during this phase - these are discussed below.
- If the number of entries and a brief view of contents seems OK then the database files (2 or 3 as found)

can be copied to the 'other' machine. It is **essential** that before doing so all files named STORFILE.* are deleted off that machine. Also the database security copies should be retained for some time until both users are sure the merge operation has gone correctly.

Possible Problems:

If the above copy command is not entered exactly as shown then you will receive a 'Direct Access File Mismatch' error message.

Secondly, the two user databases may contain database records for the same product. User A and User B may have both created (perhaps different) details for one or more products. PALLETMANAGER will report duplicate entries but itself make the choice as to which to retain and which to discard.

A1.6 Style Editing Warning / Extra Information Screens.

Each time a user enters the Style database they are warned that initially the display is set so as to prevent unintentional changes. User feedback suggested that for such a detailed screen this was necessary and a repeated warning on each use would ensure that occasional users were aware of this fact. Some users might find this annoying and thus an option is provided on screen to allow the warning message to be switched off.

To re-instate the warning message the file **nowarn30** (with NO filename extension) found in the installation folder should be deleted.

In a similar manner extra information screens are displayed (a) When about to select the Pallet / Style and (b) when displaying ranked results which give the user further information on what they are able to do on the screen which is about to be displayed. To re-instate these warnings (which the user is able to suppress) files **nowarn20** and **nowarn50** should be deleted.

A1.7 Selecting layouts - slow screen update.

Having obtained the tabular results for a problem and selected a solution to examine further the next stage is to select and display possible pallet layouts. Two dimensional and subsequently three dimensional layouts are shown. On this screen it is possible to cut part of the screen image onto the clipboard. This is done by positioning the mouse at one corner of the area required and then depressing the left mouse button and stretching the rectangular area to enclose the region - then release the mouse button. (A non-trivial sized region must be selected). A screen message indicates that the action has taken place is then displayed.

One result of the ability to cut and paste on this screen is a **degradation in display update speed on this screen (only) on older equipment** - this is a function of Windows!! On most modern equipment this will **not** prove a problem. However, if this does prove to be a problem, and if you do not wish to cut and paste from this screen, then you can obtain a dramatic speed improvement by creating in the installation folder a file named 'fast0451' (no filename extension). You will not be able to use cut and paste from this screen but graphics speed will be greatly enhanced.

A1.8 On-Top Windows.

On a couple of screens we have utilised menu or button entries which stay on-top of both PALLETMANAGER screens and any other Windows applications. Such menu / buttons are typically used to manipulate layouts or move on when displaying reports on screen. You may find that when mixing the use of PALLETMANAGER with other applications (e.g. when cutting and pasting from PALLETMANAGER to Word) the menu obstructs your use of Word. Please note that the mouse **can** be used to move such a menu so that it does not obstruct other applications - just a small menu margin will remain in view.

A1.9 Dead Windows Processes.

During extensive testing we have encountered very occasional display problems when running this release on very old Windows 95! equipment. When displaying on-screen the various reports, following completion of

display of a report a blank entry sometimes remains on the Windows taskbar. This entry disappears when clicked on. This has no effect on the operation of any software as it is a process which has already closed but the taskbar has not been updated. This problem has never been reported on Windows 98 or later equipment.

A1.10 Alternate STORFILE location.

This feature has been retained in this release but to avoid confusion it is recommended that it **not** be used. The files created by the Store module may be saved to an alternate folder (rather than the PALLETMANAGER installation folder). To action this:

- Create such a folder (e.g. c:\mystore\)
- Edit (using Wordpad/Notepad) the file PMCONFIG in the installation folder so that line 1 contains the pathname (c:\mystore\) and save it.
- **Copy this file to the created folder** (c:\mystore\).

Note that the pathname (local or network) must NOT contain blanks or 'special' characters. If you have already saved specifications using the STORE modules then file STORFILE.* (2 or 3 files) will be found in the PALLETMANAGER installation folder and should be copied to c:\mystore\ together with PMCONFIG file mentioned above.

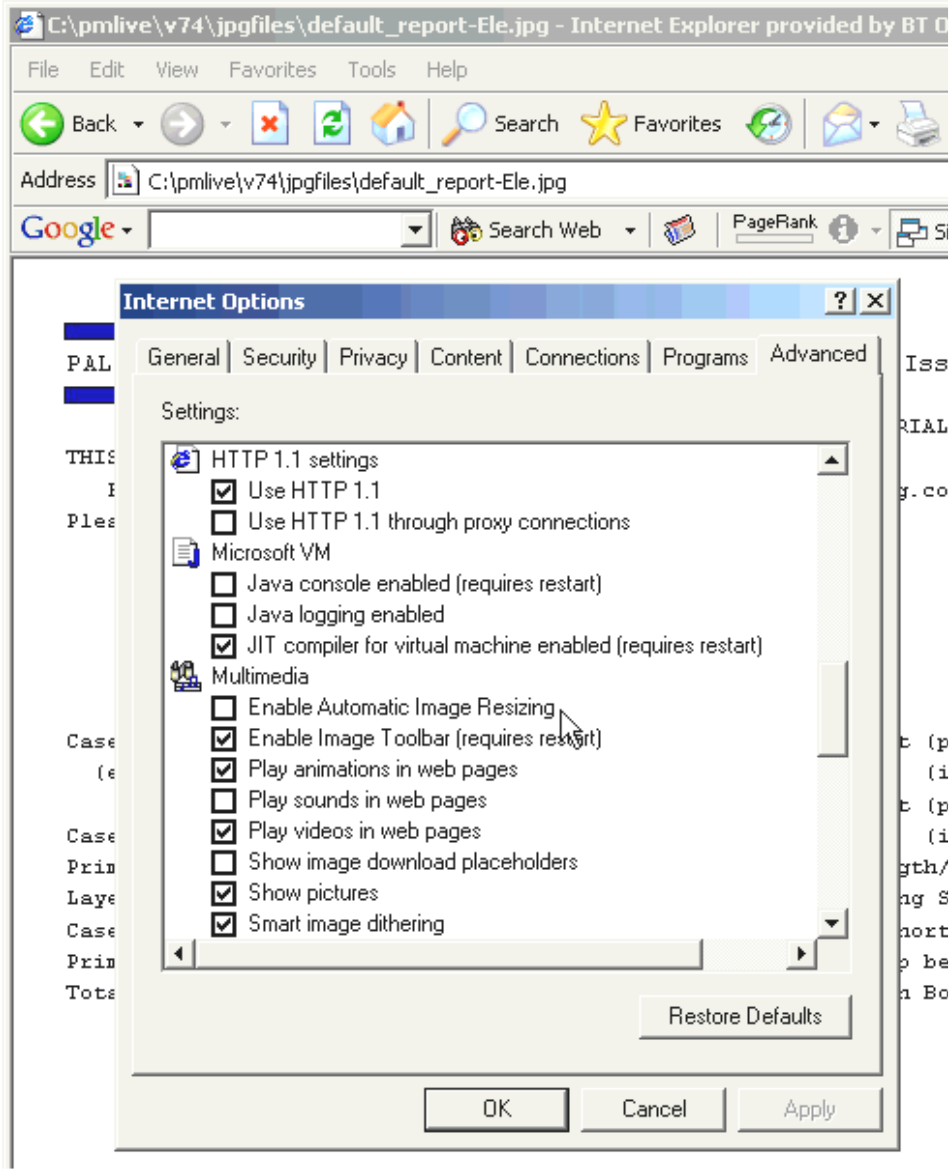
Files (or new entries in the existing files) will then be created when required in the new folder name.

A1.11 Moving onto a new machine.

If moving the software between machines then you could re-install the application on the new machine (from disks) and then copy over the user modified files listed at the end of Section 2.. Alternatively copying the whole PALLETMANAGER directory (and any sub-folders) over to the new machine will create a suitable working system. The startup command for PALLETMANAGER is RUNPM.EXE .

A1.12 Webbase and Explorer 6,7 and 8.

The Webbase module displays palletisation specifications within a standard browser. When using the more recent Internet Explorer browser you may find that one of the new features of this browser results in reports being displayed in the browser window in a 'miniaturized' form (which is unreadable - as shown in the picture below), with a large button being displayed on top of the image 'to display image at normal size'. This problem can easily overcome by making a change to the Explorer configuration. From the **Tools** menu select **Internet Options** and the **Advanced** section. Then ensure that the entry under Multimedia - **Enable automatic image resize** - is NOT ticked. **Then select Apply**. This will ensure that Explorer does NOT take over the re-sizing of reports displayed on screen. This is illustrated overleaf.



A1.13 Cylinder Modes.

Normally **PALLETMANAGER** assumes that items being packed are cubic in form, rather than cylindrical, however as described in Section 10 of the manual you can of course pack cylindrical items in any of the modes Palletise, Collation or Tertiary.

Until recently the selection of the Cylinder option in both Palletise and Collation modes required the user to Select Screen 4 - Advanced Options - during data entry, and make an appropriate entry on that screen. However to further simplify operation the Cylinder Selection Box is now also made available on Screen 3 (where pallet / style details are selected). Thus users may select Cylinder mode without necessarily going via the Advanced Options screen. Users who are accustomed to making the selection on the Advanced Options screen may, of course, continue to do so.

A further optional enhancement has also recently been added to the software is the ability to change the default setting of the Cylinder Option selection boxes on all of the modes Palletise, Collation and Tertiary. Normally, when the dimensions of the product are such that they might indeed be a cylinder (i.e 2 or more dimensions are the same), then the tick box will be available but unticked.

It is possible to change this default setting, **though users might well be advised to consider the implications before doing so**. If the default setting is changed to 'Cylinder' by default as described below then whenever two dimensions of the input data are identical then a cylinder will be assumed. This will also be true when **re-entering any screen** on which cylinder mode may be selected, and thus might prove

confusing to some users.

To activate Cylinder as default on Palletise, Collation and Tertiary screens you need to create a file **cylinder.def** in the **PALLETMANAGER** installation folder. This can be created using any suitable application but it must be stressed that the file extension is .def . The content of the file is irrelevant.

If at a later stage you wish to remove the cylinder default setting then the cylinder.def file should be deleted.

A1.14 Alternate Manual Formats.

The latest CD builds of **PALLETMANAGER** provide access to the full 160 pages of the manual three different ways.

(1/2) From the Opening Screen of the software users can access a fully searchable manual. This allows users to provide a search term and receive back a relevance list of those manual sections where the best match is obtained. For technical reasons this is provided in 2 different forms - a file pmmanual.exe and an alternate version pmmanalt.exe. The former of these files is the default, but requires a computer on which Internet Explorer 4 (or higher) is installed - but **not** necessarily as the default browser. The alternate version does not require Internet Explorer to be installed at all but provides somewhat fewer search facilities.

In the unlikely event that users find that the default manual (pmmanual.exe) does not load then simply delete the file pmmanual.exe found in the installation folder and the default version will automatically be utilised.

(3) **Exactly the same material** is provided in standard HTML pages. Throughout the software direct links are provided to these pages, with the links taking the user directly to the part of the manual which is relevant at the time that the **manual** link is selected.

A1.15 Protecting from Multiple Use.

PALLETMANAGER is a single user application and if used by 2 or more people at the same time file / database corruption will occur. If installed on a network location then a simple mechanism is available to prevent multiple use. If the file PMCONFIG is edited so that Line 2 contains just the text NET then whenever **PALLETMANAGER** is run a file PMINUSE is created in the installation folder. Any other user who tries to use the application at the same time is prevented from using it and informed in an appropriate way. This PMINUSE file is deleted when the user exits the software.

A1.16 Screen Font Size.

Also note that whilst most font size changes are accommodated by the software, we have come across one instance under Windows 2000 when the very large font size in use caused the operating buttons at the base of screen to 'fall off screen'. Using Start / Settings / Control Panel / Display / Settings / Advanced to select a slightly smaller font will cure any such problem. We have been unable to duplicate this problem on other platforms.

A1.17 Display of Your Logo on Screen / Printer Reports.

The Palletise and Collation reports of **PALLETMANAGER** have for many years used, in the top left hand corner of the display / printer, a **PALLETMANAGER** logo. In response to requests from users we have now provided a facility whereby this may be customised so that your company logo may be displayed in the top left hand corner of the Palletisation and Collation reports. The procedure to achieve this is described below.

The Logo will be displayed on all newly produced Palletisation and Collation reports, and also on any of these re-printed from the **STORE** database. It will NOT change the images current held in the Webbase database, but will be included on new reports added to the Webbase.

A company logo in either .BMP or .JPG format is required. This may be in 8 bit or 24 bit BMP format or 24 bit JPG format - a 24bit image is preferable. The area available for display on reports is rectangular, and

somewhat wider than it is high. The image provided should ideally have a width of around 300 pixels (for a 'landscape' orientation logo) or a height around 200 pixels (for a 'portrait' orientation logo). [***See further important discussion at the bottom of this section***]

Whatever size is provided the aspect ratio (width : height) WILL be retained and the size adjusted (up or down) to fit the area available. A very small file will be 'blown up' in size and thus may appear rather blurred. It is suggested that you / your IT function experiment with various sizes of image. Given the differences that will always exist between on-screen and printer resolution the effect of size changes on both screen and printer operation should be tested.

The file **MUST** be named **PMLOGO.BMP or PMLOGO.JPG**. If files of both names exist then the .BMP file will take priority (i.e. be used). If a suitable file is not found then the display / printing will utilise the previous standard **PALLETMANAGER** logo. You should note that a file named PMGOAL.BMP / .JPG may be produced by our software as part of the display/printing process. This name should NOT be used by users.

Further important technical notes:

1. For technical reasons PALLETMANAGER 'constructs' the image which will be displayed / printed (based on the information in the PMLOGO file) at the point where the menu to select printouts (Palletise / Collation etc) is **first displayed** - that is on first display of Screen 7 or Screen 9p. **If experimenting with different PMLOGO files you therefore need to go 'Back One screen' from the Printing / Display Menu (e.g. go back to Screen 6) and then forward again to the Menu screen in order to see the effect of a logo file change.**

2. The image sizes suggested above will on most devices produce a reasonably good image on both printer and on screen. Printers will normally have a higher resolution and thus a logo of (say) 500 pixels wide might be used, but this would display on screen as a rather poorer image. Those using the Webbase database should also test the output quality of images on the Webbase .JPG files.

3. Note that if both PMLOGO.BMP and .JPG exist then the .BMP image will be used.

4. We have on one occasion (on one of our own machines) under Windows Vista / Windows 7 encountered a problem when using a logo file, the symptoms of which were a program failure when printing with a 'Blue Screen of Death', this being a reboot of the machine when print was initiated. The solution to what we believe is a Windows bug was to completely delete the printer causing the problem and then re-install it using the latest printer drivers. Note that just doing a printer update using Windows update did not solve the problem. Extensive testing at the time on other Windows Vista / Windows 7 machines did not see the problem occur.

A1.18 Wide Screen Displays.

Wide screen displays are becoming increasingly popular and, depending upon the operating system in use, users may well wish to use the right hand side of the display to display, at all times, useful tools (such as a clock!).

To ensure that the software display does not take over the full screen when it is being used on wide screen displays the window generated on such screens is automatically reduced so that it initially occupies around 70% of the screen (depending upon screen ratio), with the window being positioned to the left top of the screen. The window can be moved (using the mouse), or expanded to full screen (by clicking on the top title bar of the window). However the automatic re-size will ONLY apply when the graphics resolution used by the graphics adaptor differs from the standard width / height ratio of 'normal' screens - that is 1.33 or 1.25. Thus re-sizing would apply, for example, when using a graphics resolution of 1680*1050 - a 1.6 ratio.

If however a user would like to software to utilise the full area of the screen at all times then it is possible to configure this to happen as described below.

To set the software **so that it always uses the full screen on wide screen displays:**

Create in the application installation folder a file named USEFULLS - this could be done using an application such as notepad / wordpad / word etc. The content of the file does NOT matter, the fact that the file exists is the only requirement to give a full screen display on a wide screen monitor.

Files created with most such applications will NOT immediately have the correct name as the application will add a file extension to the filename (e.g. USEFULLS.TXT, USEFULLS.DOC etc). However an additional complication is that depending upon the machine configuration this extension may not be displayed in the file list. To ensure the file created has NO file extension at all it is suggested that having created the file using the procedure above you highlight the file name in Windows Explorer, then right click the mouse and select Rename and then replace the whole of the displayed name by (just) USEFULLS

A1.19 Alternate Palletisation Report Format and the new Ti/High report.

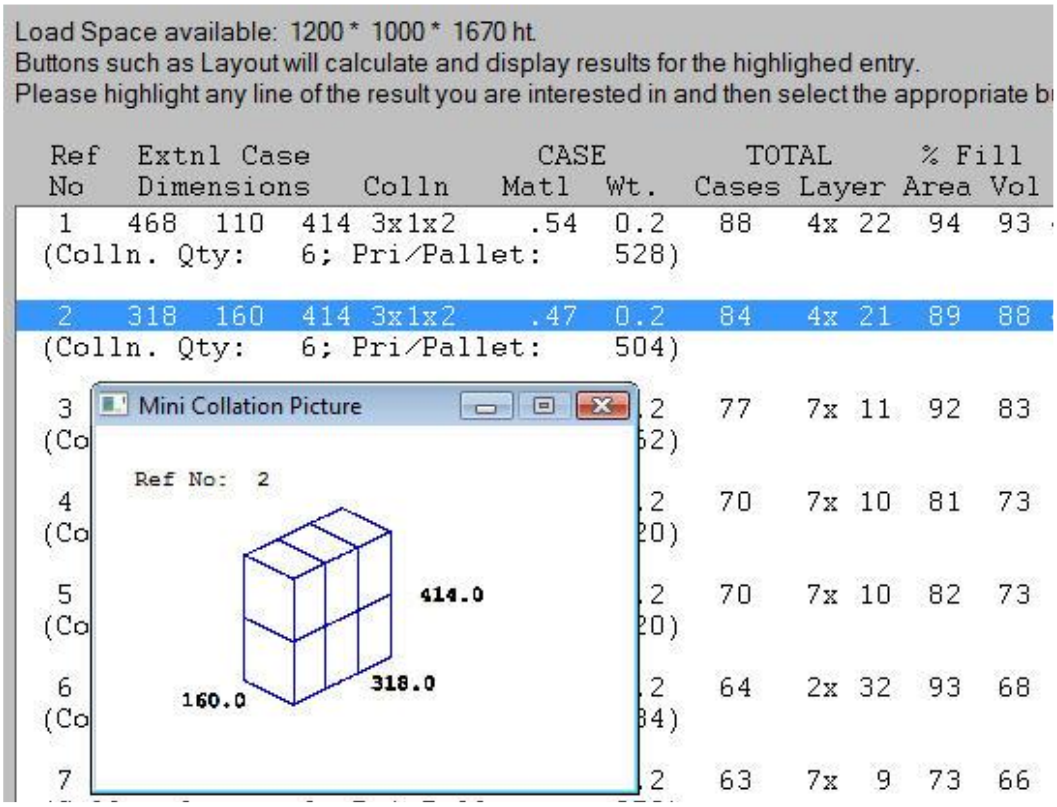
In response to user feedback we now offer an alternate Palletisation Report Format. This contains similar information to that of our 'historical' report but uses a different layout.

The new report can be selected using a tick box on the screen where Special Notes are entered and reports selected for Screen / Printer / Webbase output. By default the 'historical' report format is used as default, with the new format being produced when the appropriate tick box entry is made. If a user requires that the new format be used as the **default** then a file named **altpalrp** (no filename extension) should be created in the PALLETMANAGER install folder. This will then automatically enter a tick into the appropriate tick-box - but the user can always de-select it.

The new Ti-High report (which is essentially a combination of the Palletise and Collation reports), also supports this twin format setup and the alternate format is achieved in exactly the same manner.

A1.20 Mini Collation Picture and Splash Screens.

We have recently added to Collation mode the automatic display in a small window of the collation arrangement as an additional window as users highlight entries on Screen 5:



As the user moves to highlight another entry (say entry Ref 3), the picture for Ref No: 2 will disappear and that for Reference 3 will replace it.

The mechanism used to display and then 'kill' this picture uses the same standard Windows command as is used to display GOAL splash screens which appear for a short while whilst calculations are taking place. This process is unchanged from releases over the past 5 years.

We are aware of one user of a networked system where the commands from PALLETMANAGER to 'kill' the splash screens automatically once they have completed their function is not obeyed. This is a function of the failure to provide the user (in a networked environment) with standard rights to start and stop their own applications. In this release the splash screens and the above Mini Collation windows can be terminated by the user using the standard Close button at the top right of the window. Ideally users should be given standard Windows user rights so that PALLETMANAGER can close these screens as required. A 'quick fix' would be to delete (after installation) the two splash screens from the application folder (pmbusy.exe and pmbusy1.exe). The program which produces the Mini-Collation pictures (pmbusy650.exe) could also be deleted but this would remove what we feel to be a very useful addition to the functions in Collation mode.

Once again we wish you will in using this version of PALLETMANAGER and welcome feedback from both technical support staff and users on ways in which we could improve the software and documentation.

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APPENDIX 2 -

e-PALLET : Integrated email of specifications.

(Includes Introduction, How it Works, Installation, Additional Questions)

A2.1. Introduction.

This section described a new low cost easy to use add-on function for **PALLETMANAGER** that enables users to email palletisation specifications directly from within the application in a format identical to that normally produced on the printer.

This is NOT provided as part of the web download. If required it is always distributed as a separate application on its own CD. If you already have a recent CD build of PALLETMANAGER (dated 4/2004 or later), then you can simply download a trial version of the PDF software from www.broadgun.com .

Alternatively your company may already have a licence for a product from (for example) Adobe which produced PDF files from Windows applications, or a product such as PrimoPDF. Such products are likely to be suitable for use as an alternative to produce the required PDF output file.

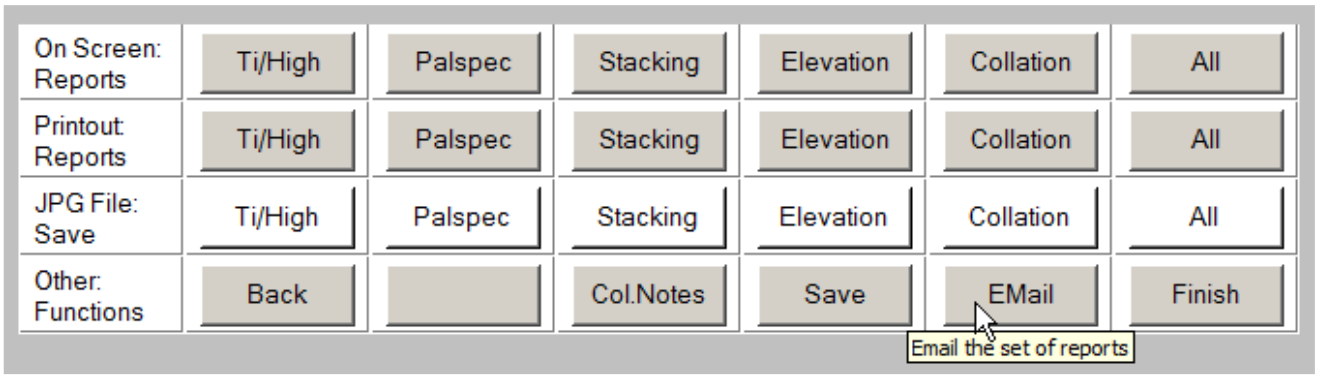
The email attachment produced uses the widely popular Adobe PDF format - already in extensive use for web pages - e.g. the download of all the UK tax forms! - and simply requires the users to have installed the free Adobe Reader. A majority of PC's are likely to already have this installed or it can be downloaded from Adobe.

A2.2. How the email facility works.

Normally **PALLETMANAGER** users might print out a specification and then if required fax this to one or more locations.

When a suitable PDF program is installed and **ANY of the Printout Report buttons** Ti/High / Palspec / Stacking / Elevation / Collation is selected then normally a single page report will be produced and can be output to the installed PDF program rather than to a real physical printer. A PDF file is created and can be saved to disk for later printing or emailing as required.

The **single button EMail** can be used to 'bundle together' the Palspec, Stacking, Elevation and Collation reports together as a single file (containing 3 or 4 pages depending upon operating mode) and direct this to a PDF program (or to a physical printer). It does NOT include the Ti/High report as this will normally be output as a single page report using the Ti/High Print button (to printer or PDF).



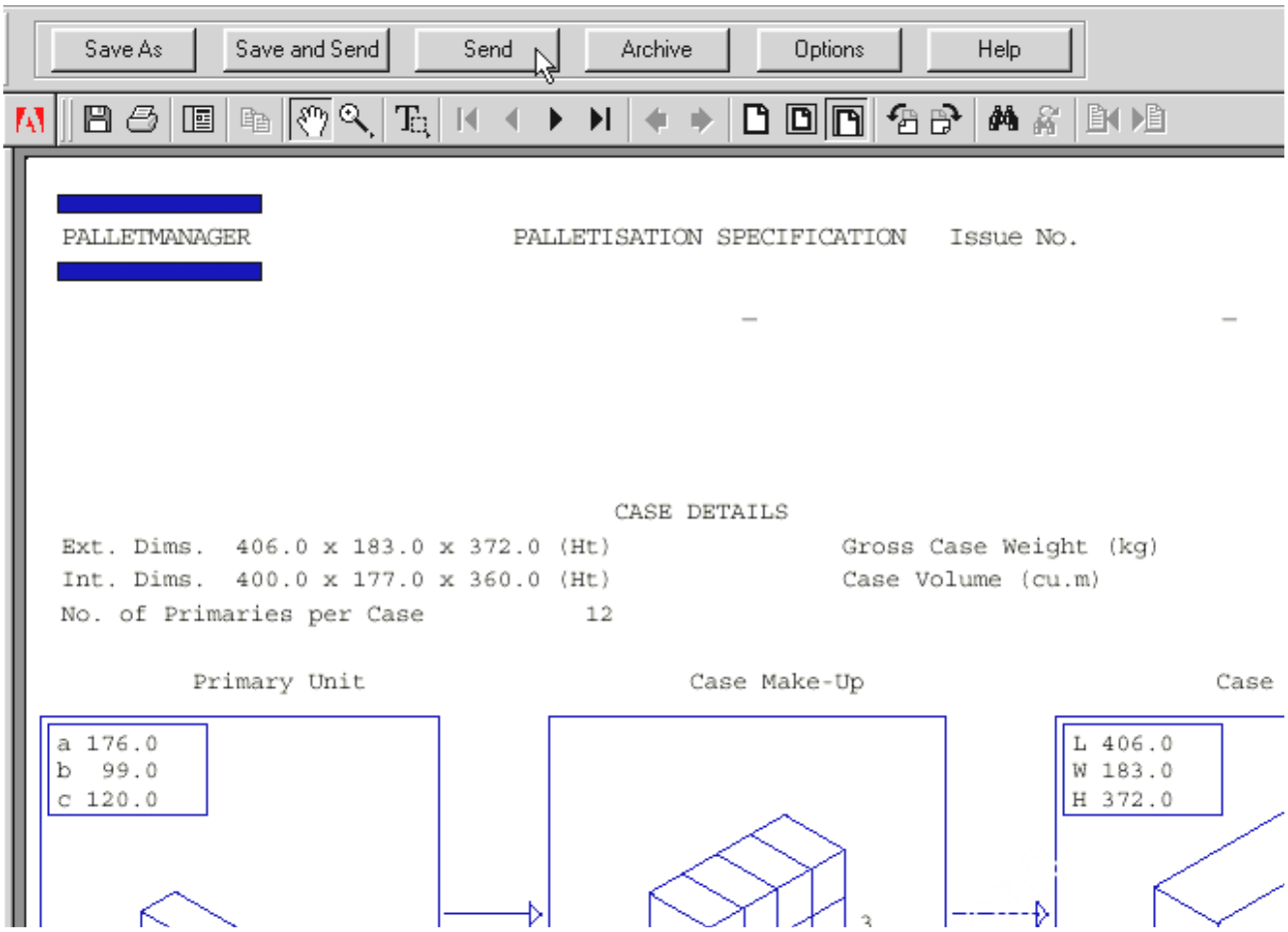
Whilst PDF is a frequently used format other 'virtual graphics' printers can be used. For example Microsoft encourage (in later Office versions) the use of the Microsoft XPS driver. A similar approach can be used with such drivers, though in our experience the file sizes created are somewhat large.

For many years we have used / recommended the Broadgun product and the screens produced when this PDF driver is installed are illustrated below:

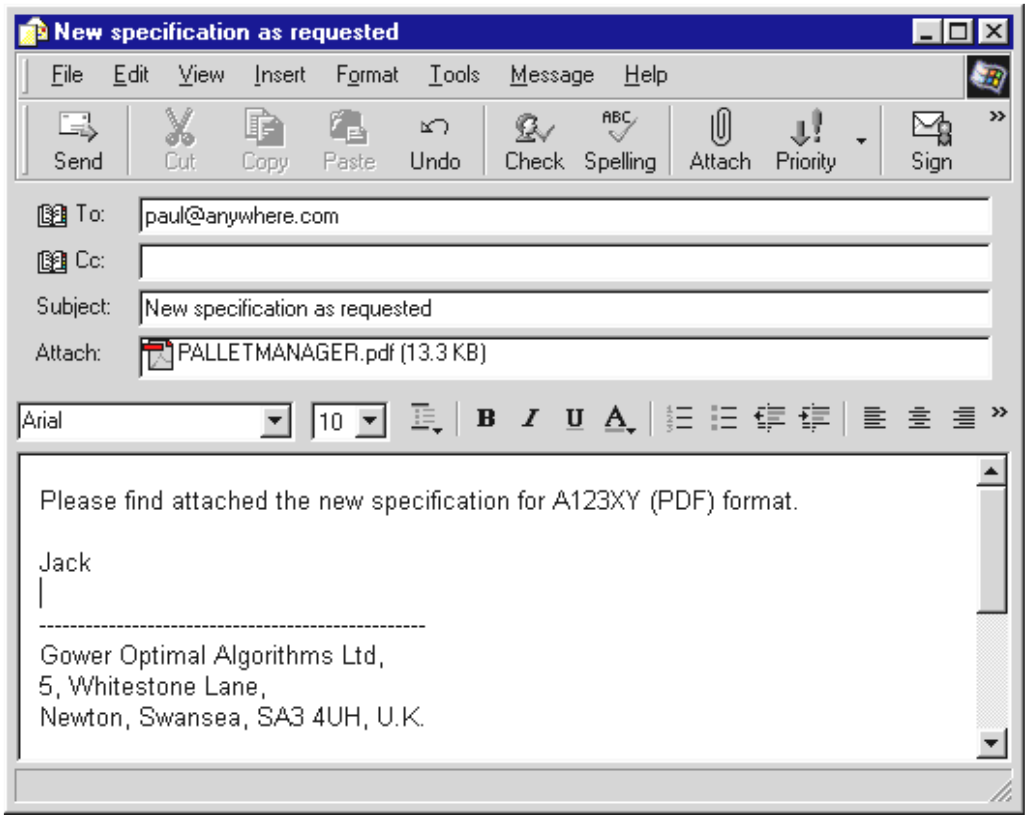
The resulting output which would 'normally' have gone to your printer is then displayed on screen in PDF format. You can then select to either save this PDF format file to disk (one way of saving specifications for future recall) and/or select Send to launch your email system with the report already set as an attachment. This is illustrated below.

The add-on requires reasonably recent print programs for your PM application (these may already be installed - see text above), together with a licenced Broadgun PDF / Email driver system. . File attachment sizes are small - typically 15k - 50k.

The first screen below shows the screen display after selecting the PDF Email option. The full report (in PDF format) is shown on-screen. You can naturally view any / all and select printouts if you wish. Then you select Send....



and the screen below (in this case Microsoft Outlook mail) is automatically launched with the attachment already set in place. You just enter the recipient details and any message and send it off!



The recipient just clicks on the attached file to see the load specification!

A2.3. Installation.

As described earlier the **e-PALLET** facility uses the popular Adobe Acrobat file format for transmission of the specifications. This provides a compact file attachment which can be read on any PC using the free Acrobat reader. It is likely that this will already be installed on many machines.

Full installation instructions are provided on the Installation CD or, as described on the first page of this appendix, you may only require the PDF part of the system which can be downloaded.

A2.4. Additional Questions & Answers.

Can the default filename be changed?

Normally the filename attached to the email will have the name either PALLETMANAGER.PDF (if no product code was specified) or a filename based on the Product Code. This name **may** match exactly the product code, but if the code given by you involved characters which are invalid for a Windows filename then such characters will be substituted by a _ character - thus a code p1/123 would become a file named p1_123.pdf. You have the opportunity to change the name when selecting the Save and Email the specification.

Can I use the PDF printer selection without selecting the Email option?

The 'normal' PALLETMANAGER print programs may produce multiple reports. If you selected the PDF printer option without selecting Email (i.e. in a normal print sequence) then each report would generate a separate PDF file - thus you might end up with 5 or 6 different PDF files. The special PALLETMANAGER Email program bundles all the reports together to produce a single neat PDF file.

Can I use the PDF printer selection with other programs?

You will be able to supplied (licenced) PDF program to email output from many other Windows applications in PDF format. It will depend on the procedure used to produce print files within each application but in general this will be possible.

Can any PDF generation program be used?

We have over the years tested a variety of programs and nearly all have worked successfully.

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