

Pallet Comparison Analysis – In House Routines.

The latest version of PALLETMANAGER includes a module that specifically addresses the problem of comparing the performance achieved when loading a given case size onto two different pallet sizes (e.g. 1200mm * 1000mm and 1200mm * 800mm), and presenting the performance side by side. The user is then able to select the desired pallet size and view / print / save / publish the solution using one or more of 4 report formats. In doing so the user will select an appropriate stable (optimal) pallet arrangement from those available and determine the exact manner in which the stack is to be built.

Whilst the above analysis quickly provides solutions for individual products (and will probably be essential to ensure for each product a stable stack is constructed), we have in-house a number of powerful tools to analyse large sets of data and return to the user (typically in spreadsheet format) the performance of cases when palletised on 1, 2 or more pallet sizes. This document illustrates a recent study we carried out for a client and the type of results that can be produced.

The client wished to determine the efficiency with which a set of over 6500 products could be palletised on both 1200mm * 1000mm pallets and 1200mm * 800mm pallets. They provided to us on this occasion a spreadsheet containing product details as shown below:

	A	B	C	D	E	F	G
1	Part Number	Unit Of Measure	Length (mm)	Width (mm)	Height (mm)	Gross Weight (kg)	Net Weight(kg)
2	M9085-9999	Case	150	100	100	0.001	0.001
3	L0513-9964	Case	140	50	220	1.2	0.89
4	L5291-9966	Case	130	100	160	0.001	0.001
5	L0865-9867	Case	165	135	100	0.001	0.001
6	W9419-	Case	100	135	165	0.007	0.007
7	98TDB-9999	Case	180	100	130	1.6	1.18
8	98IUX-9999	Case	200	140	100	0.001	0.001
9	N0814-9984	Case	150	193	100	0.8	0.57
10	K3664-9964	Case	210	110	130	0.001	0
11	C5519-996A	Case	105	220	130	0	0
12	20688-9993	Case	135	165	135	0.006	0.005
13	H6009-9999	Case	110	110	250	0	0
14	M0615-9999	Case	110	250	110	0.49	0.48

The remit was to palletise in an optimal manner onto both pallet sizes, considering both the situation where the case height **must** be vertical, and the situation where the case could be placed on the pallet with any of its 3 dimensions as vertical.

We were able to extract the data, perform the required analysis, and return results to the client as a spreadsheet – an extract of the same being shown below. The green columns refer to a 1200*1000 pallet and the yellow columns to 1200*800 pallet (using the same loading height limit).

Part Number	Ht Vertical	% Util / Ht Vert	Any Vertical	Any Vertical 12*10	Ht Vert	% Util / Ht vert	Any Vertical	Any Vertical 12*8
	NPP 1200*1000	1200*1000	NPP 1200*1000	% utilisation	NPP 1200*800	1200 * 800	NPP 1200*800	% utilisation
M9085-9999	1520	97.94	1520	97.94	1216	97.94	1216	97.94
L0513-9964	1360	89.97	1444	95.52	1088	89.97	1140	94.27
L5291-9966	1080	96.49	1083	96.76	864	96.49	874	97.61
L0865-9867	988	94.53	1008	96.45	760	90.9	798	95.44
W9419-	957	91.57	1008	96.45	759	90.78	798	95.44
98TDB-9999	924	92.88	931	93.58	728	91.47	760	95.49
98IUX-9999	798	95.98	798	95.98	627	94.27	627	94.27
N0814-9984	760	94.51	800	99.48	608	94.51	640	99.48
K3664-9964	686	88.49	747	96.36	532	85.78	585	94.33
C5519-996A	686	88.49	720	92.88	532	85.78	576	92.88
20688-9993	728	94.04	728	94.04	560	90.42	560	90.42
H6009-9999	630	81.86	731	94.99	490	79.59	578	93.88
M0615-9999	731	94.99	731	94.99	578	93.88	578	93.88

For each part number we determined:

- The number of cases per pallet (NPP) assuming the height **must** be vertical.
- The % utilisation (% volume fill) under this same assumption.
- The number of cases per pallet (NPP) assuming any one of the 3 case dimensions could be vertical.
- The % utilisation (% volume fill) under this same assumption.

We then repeated the examination for the 2nd pallet size, and could have gone on to do the same for other pallet sizes if required.

The above results enabled us to draw some initial conclusions as to the desirability of using the 2 different pallet sizes for this set of products, for example the following conclusions were drawn:

- 75% of the products (on this occasion) achieved a higher or equal % volume performance on a 1200*1000 pallet, whilst 25% achieved a higher % volume performance on 1200*800 pallets.
- Using a 1200*1000 pallet for this 75% of cases provided on average a 4.85% improvement over that which would have been achieved if a 1200*800 pallet size had been used for them, with in some instances a 33% improvement being achieved.
- Using a 1200*800 pallet for the 25% of cases (where this pallet size was better), provided on average a 5.2% improvement over that which would have been achieved if a 1200*1000 pallet size had been used for them, with in some instances a 20% improvement being achieved.

Obviously the client was able to make far more meaningful use of the results in terms of efficiency and costings and determine which pallet size should be used for particular products.

Having made this decision then the PALLETISE or PALLET COMPARE modes of PALLETMANAGER can be used to produce suitable optimal and stable pallet specifications and share these as required.

It is possible to potentially automate this to produce a web based database of palletisation specifications, BUT this is subject to the assumption that a stable pallet stack using (say) column stacking is acceptable. In reality for any palletisation problem there will be a number of optimal pallet stacking arrangements and to achieve a practical and stable stack will normally require manual selection of appropriate layouts.

In an automated mode some examples of the type of reports available can be seen at www.goweralg.co.uk/dhlpallas

Please contact Gower Optimal Algorithms Ltd for more information.

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