



Sorcerer and Warlock

Advanced Software for Roof and Wall Design and Estimating

Tutorial

– Completing a mono-ridge metal roof with roof lights.

Revision: 1.1 – 24 August 2009

Metric Units

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Tutorial – Mono-Ridge Metal Roof

Overview of Process

A job typically arrives as a hardcopy drawing or a CAD file – usually as a DWG. As CAD file formats are so varied, we recommend that you request DXF format over DWG – the format of DXF does not change and we can always open a DXF file.

Open the DXF and extract critical measurements. In this case, the building is 25,000 long by 7,700 wide. The roof pitch is 8°. There are no over-hangs or barge extensions.

The roof has a standard 1000 wide panel and purlins/battens at 1500 centres, with polycarbonate/FRP roof lights at selected locations. Also fitted are several spinning type ventilators.

The building also has an awning on the high side along the full length at 2630 high with 1000 wide cladding panels, selected panels with contrasting finish colour.

That describes our building now let's get to preparing our quotation.

This Tutorial must be read in conjunction with the Reference Manual and the Setup Guide supplied with the software.

Step 1 – Check material definitions.

Before materials can be estimated, they must be correctly defined. They would typically be defined in the following order to ensure that everything needed was available for use. ***For specific detailed instructions refer to the Setup Guide.***

Fasteners – Different fastener types will be required for fixing the purlin/battens, the roof sheets and the trim plus on occasions a stitch screw is need for the panel seam.

Flashing and Trim – Check that the required trim has been defined and any accessory items associated with that trim. In our case we need an Apron flashing also referred to as a Roof to Wall flashing. We define purlins/battens under the Flashing and Trim section. Check that the required batten has been correctly defined.

In both cases ensure that the correct estimation method has been set as this has a dramatic effect on the cut list if not correctly defined. In our case they will be set to “Total Run into Stock Lengths”. Select the required fastener.

Panels or Sheets – For this job we need two types of panel – a regular metal panel and a polycarbonate or FRP panel. Both panels will be the same cover width of 1000mm. Note the requirement for setting minimum and maximum panel lengths. A zero length allows the software to create a cut list with the shortest panel being as small as 1mm and unlimited maximum length. If the job requires a 75,000 panel, the cut list will specify it. Select the required fastener.

Metal Colours - If the panels are painted, then you might also need to check the list of paint colours to see that your required colour has been defined.

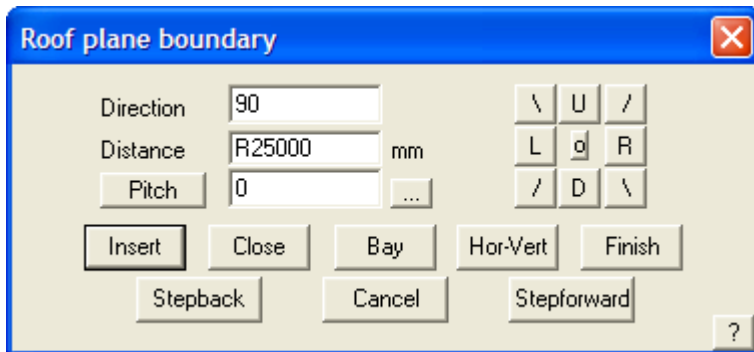
Installer's Pay Rates – You may define as many different pay rates as you need if you use the Pay Rates – Variable options. Typically, you might have different rates for different trades or different sub-contractors.

Step 2 – Create the 3D Roof model.

Using the dimensions provided, and the **Cover > Track Plane** function (Track Outline generates a hip roof; Track Plane a single pitch roof).



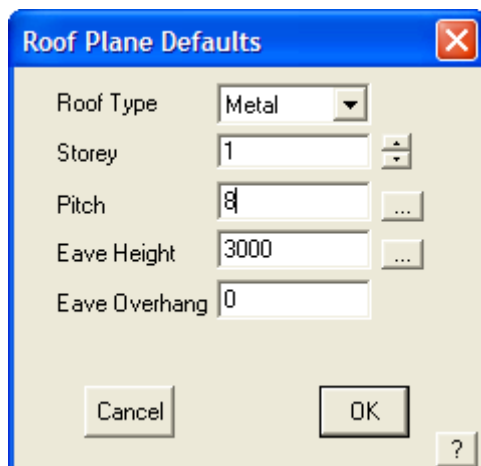
and the Roof Plane Boundary dialog box is displayed.



Insert R25000 in the Direction field and select Enter or click Insert. Then D7700 and Enter; the select Close and Close Square or just type C and Enter. The outline is closed out and the perimeter complete.

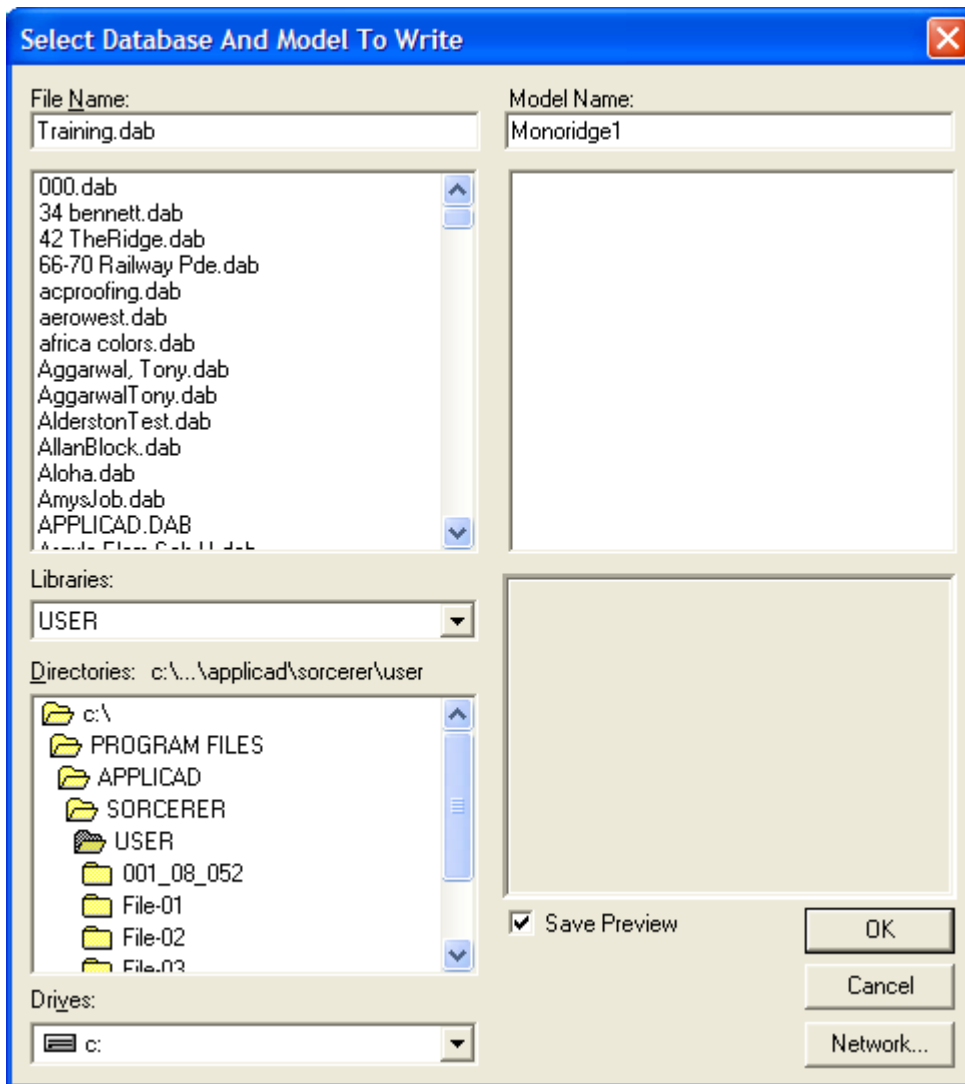
The closing is an important step for complex roof shapes as it provides a method of checking that the outline is correct. This is especially useful on field measured jobs.

The select Finish or type F and Enter. The Roof Defaults dialog is displayed.



Set the pitch to 8° and the eave height to the required amount and select OK. A cross hair cursor and the prompt 'Locate Pitching Line' is displayed. The pitching line is the line that defines the eave or low point of the roof. The line that roof pitches from.

Select the lower 25000 line. The roof is created and the roof is displayed with lines indicating a metal roof type has been selected and falling the bottom of the screen. You are prompted to save the model – save it to a Database File called **Training** and the model name **Monoridge1**.



If you change view to an Isometric view you will see that a true 3D model of your roof has been created from the basic information.

Step 3 – Check the model for accuracy

It is no use preparing a quotation if the information is incorrect, so we use the basic tools to check that our model is correct before we start applying our materials.

The usual checking tools are:

- Show Line Types
- Dimension Roof – Overall
- Dimension Roof – Lengths
- Check Roof Pitch and Storey

The **Tools > Show Line Types** allows us to check that the line has the correct flashing category assigned to it. The software makes its best guess and while most of the time it is correct, you may require a different style on a line. Remember, the line type is just that – it is not calculating flashing material at this stage.

The **Tools > Dimension Roof** function has several options: The **Overall** dimension is inserted using Auto-Insert Dimensions and are the dimensions of the roof including overhangs, so if you

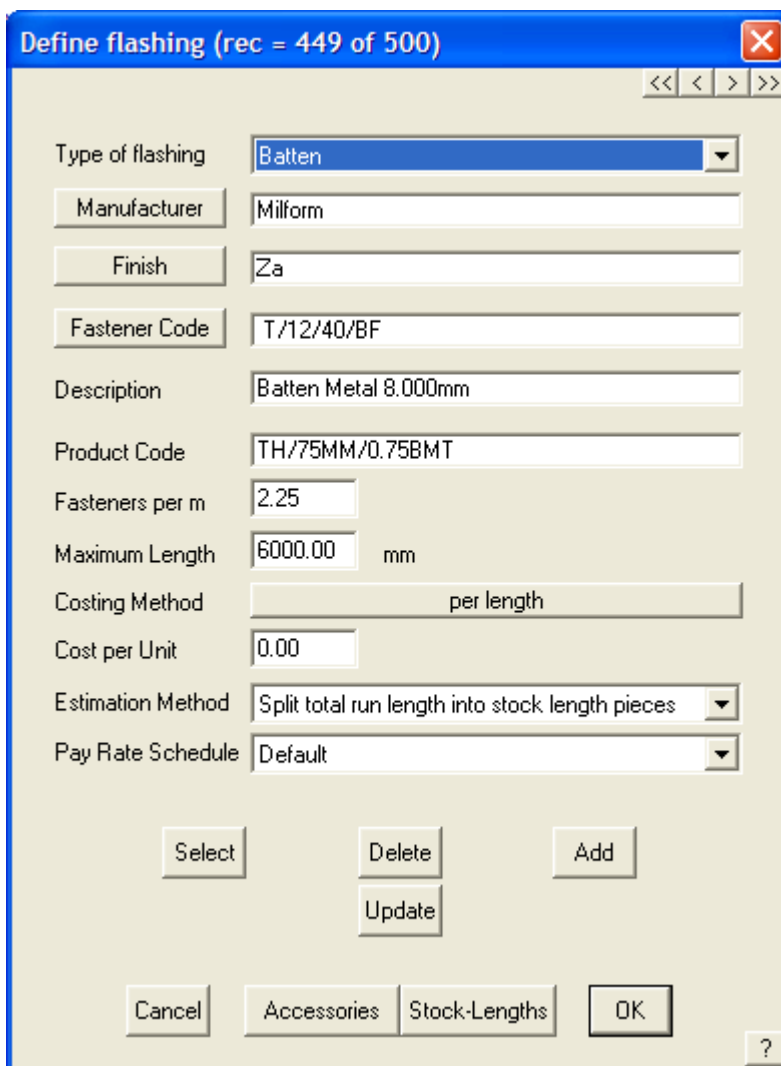
Dimension Roof	Dimension Default Settings
Project Walls	Auto-Insert Dimensions
Tally Quantities	Insert Pnt to Pnt Dim.
-----	Insert Line to Line Dim.
Change Entity	Roof Line Lengths
Measure	- Reposition Dimension
Verify Entity	- Delete Dimension
Check Model	- Dimension Preferences
-----	Insert Course Spacing
Set Display	Show Pitches/Slope
Plot	Show Line Types
More...	Display Roof Quantities

added overhang to the wall dimension, then this has been added. The **Lengths** dimensions inserted using Insert Line to Line and are the dimensions up the slope of the roof. This is more noticeable on a hip roof that the model we are currently working on.

It is useful to check the roof pitch as it is this that determines the length of our roof sheet. Use **Tools > Show Pitch** to verify correct roof pitch. It also displays the storey number. The storey number is tied in with the pay scale for installation, if that is the method of pricing that you have used.

Step 3 – Insert Battens/Purlins

Battens are defined as under the category of Flashings – **Def-Materials > Flashing**. An example might look something like this: -

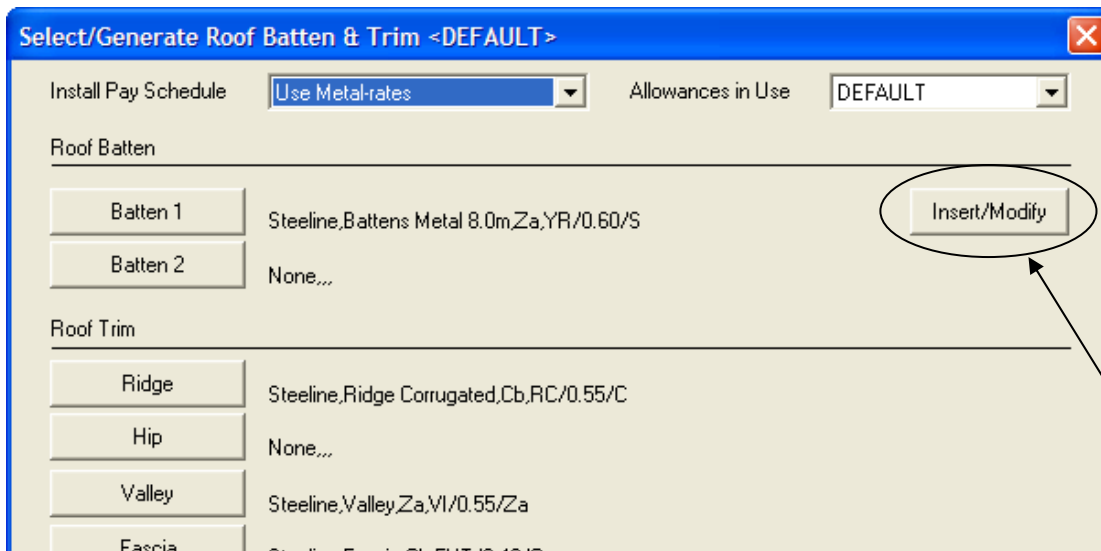


The screenshot shows a dialog box titled "Define flashing (rec = 449 of 500)". The dialog box contains the following fields and buttons:

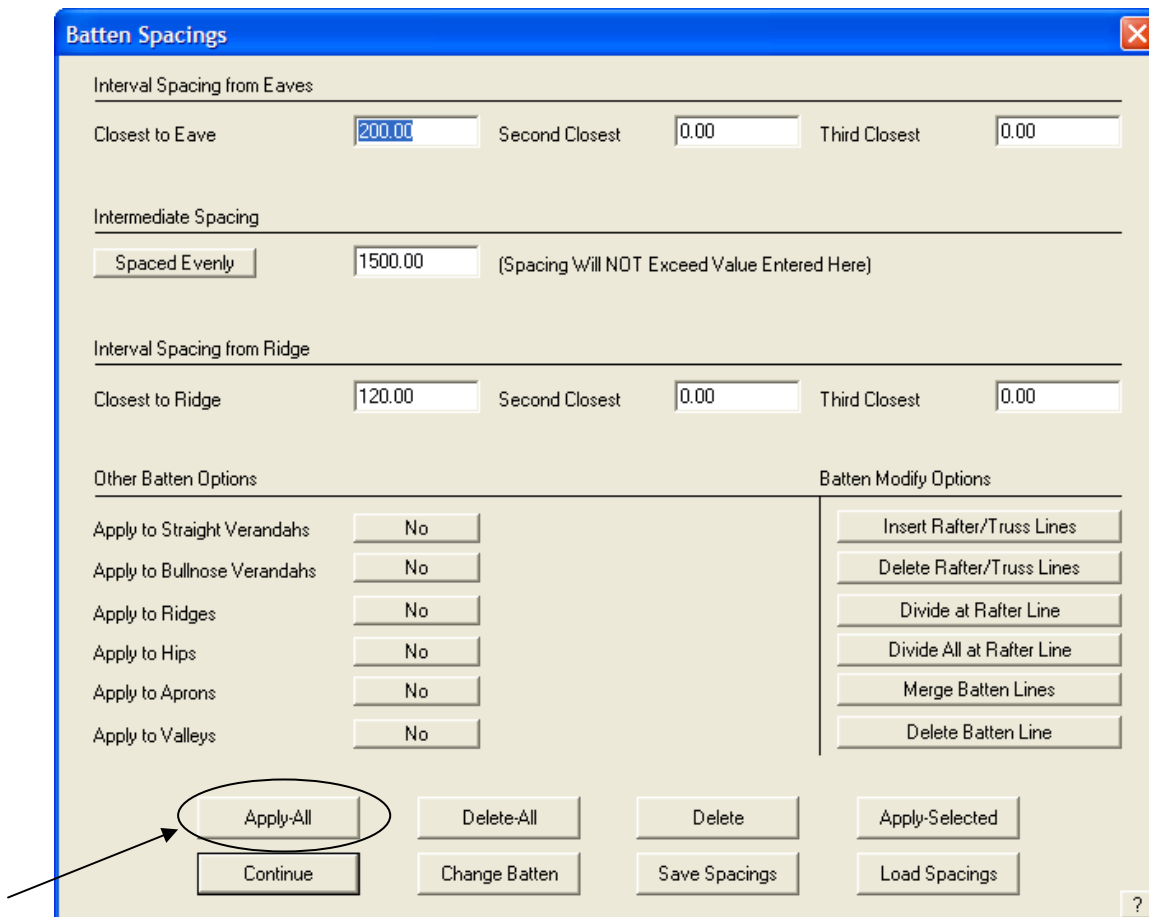
- Type of flashing: Batten (dropdown menu)
- Manufacturer: Milform (text field)
- Finish: Za (text field)
- Fastener Code: T/12/40/BF (text field)
- Description: Batten Metal 8.000mm (text field)
- Product Code: TH/75MM/0.75BMT (text field)
- Fasteners per m: 2.25 (text field)
- Maximum Length: 6000.00 mm (text field)
- Costing Method: per length (dropdown menu)
- Cost per Unit: 0.00 (text field)
- Estimation Method: Split total run length into stock length pieces (dropdown menu)
- Pay Rate Schedule: Default (dropdown menu)
- Buttons: Select, Delete, Add, Update, Cancel, Accessories, Stock-Lengths, OK, and a help icon (?)

To apply to the roof, go to **Cover > Flashing** and the following Select/Generate Roof Batten and Trim dialog box is displayed. Select the Batten 1 button, then select the required batten from your defined list of options for batten.

Once selected the item description will be displayed. Now click the **Insert/Modify** button to set the required batten spacing for your roof.



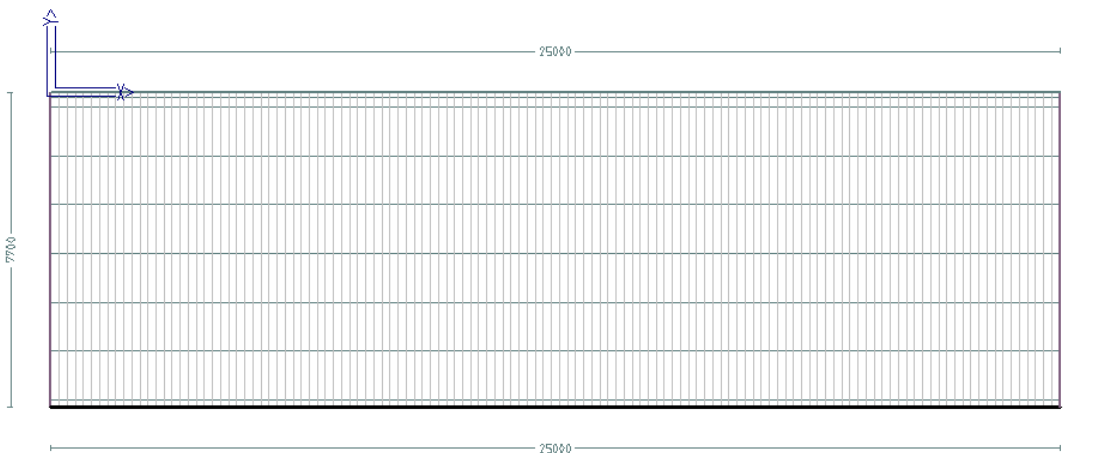
The **Insert/Modify** button brings up the following dialog box:



Here you set the required spacing for the job – working closest to eave and up the roof, then intermediate spacing and finally from the ridge back down the roof. If you do not have subsequent spacings, set to zero as shown. The intermediate spacing may be Fixed Spacing, or Even Spacing up to a maximum intermediate spacing.

On this style of work, the remaining options for battens are not normally required, so set to No.

Once defined, select the **Apply-All** button and the battens are drawn on the roof according to your definition, as shown below.



Step 4 – Generate Roof Panels

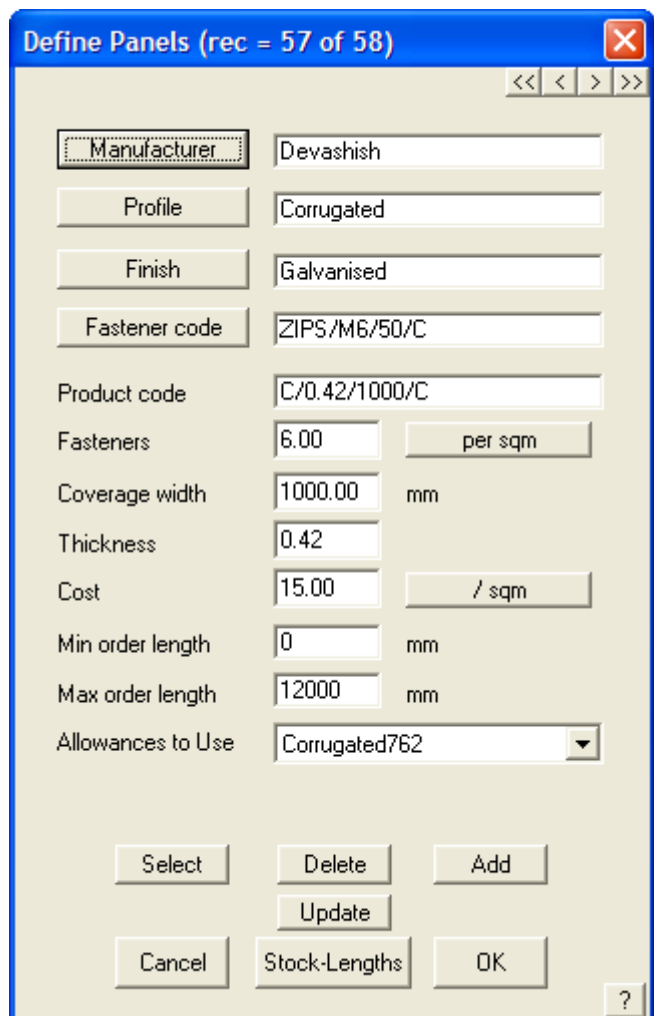
Now that we have the battens installed, we can install our roof sheets. The best method for this style of roof is **Gen-Panels**. This assumes that your panel has been defined as described above and when selected looks something like the screen at right:

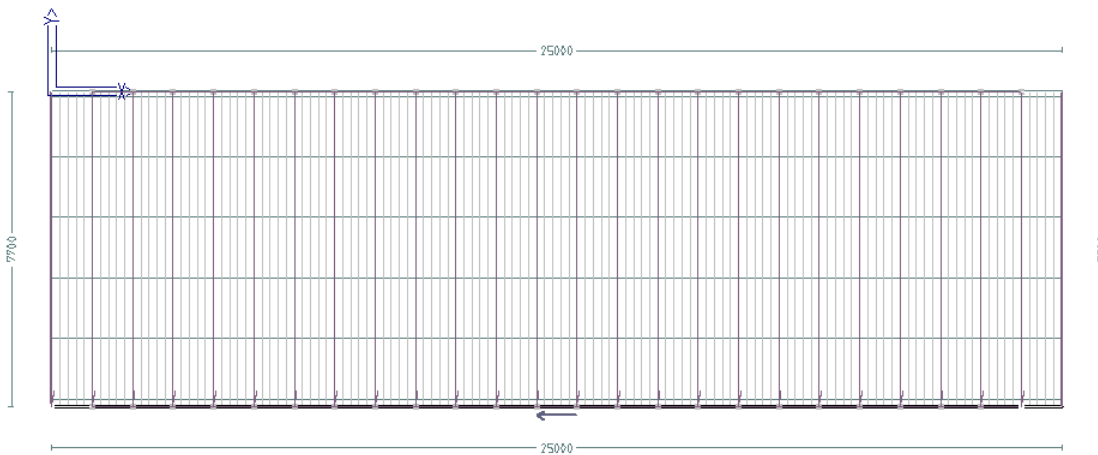
The important number to get correct is the Coverage Width, which is 1000 in this case.

Once selected, click OK and check the parameters that have been used to define the panel, then click OK.

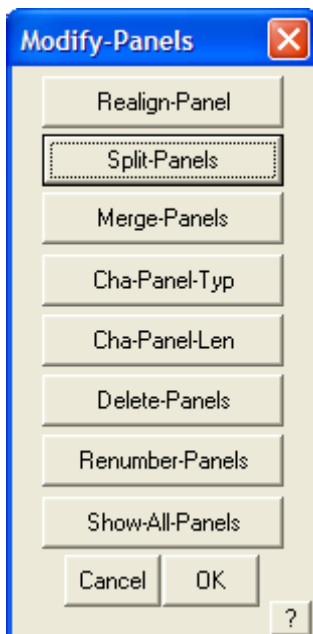
Now select **Estimate > Generate Panel Layout > Generate Panels** from the Pulldown menu.

A lay direction arrow is drawn and the panels generated across the width of the roof.



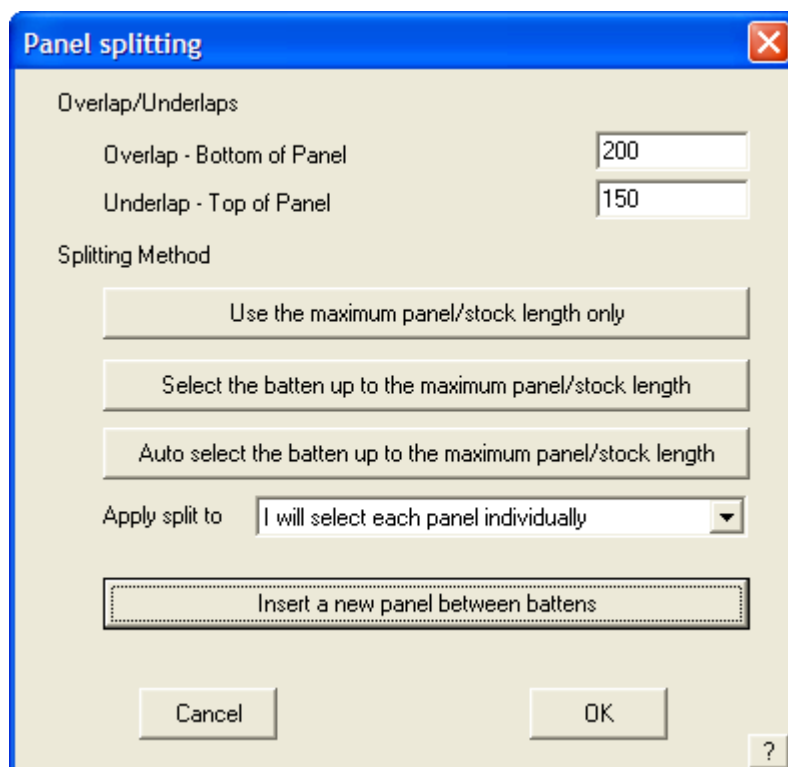


The designer has specified certain panels to be fitted with FRP or polycarbonate roof-lights. Then these need to be defined as a panel as well. This is done under Def-Materials > Metal Panels also (as they are to be fitted with metal panels. They must be the same width as the metal panel being used.



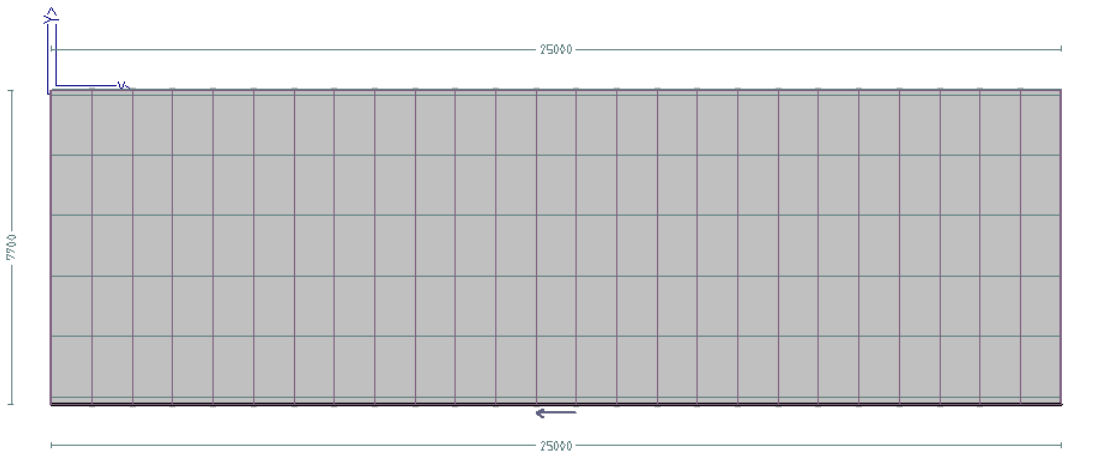
To fit them to the roof, the currently selected metal panels must be split to fit the FRP panels and the split is typically over successive battens. To do this we use **Estimate > Generate Panel Layout > Modify Panels**.

Select the **Split-Panels** option and the Panel Splitting dialog is displayed.



Set the Overlap and Underlap amounts and check that the method of application is for individual panels (as we do not need to split the entire job in this example); and then “Insert a new panel between battens” option.

The individual panels are all filled in and the battens displayed. Select the top and bottom batten where it is to split at then the panel to split. All panels in the sequence may be selected at once.



Roof Metal Panel Material

Straight Metal Pay Rate: Use Metal-rates

Allowances in Use: Corrugated762

Straight Metal

Manufacturer: Devashish

Profile: Corrugated

Product code: 270.42/1000/C

Finish: Galvanised

Change Metal

Fastener: ZIPS/M6/50/C

Fasteners per sqm: 6.00

Clip:

Clips per m: 0.00

Coverage Width: 1000.00

Seam Screw:

Screws per m: 0.00

Seam Tape / Seam Sealant:

Length Required: 1.00 litre per

Underlay: None

Fall Protection: None

FP Pitch Break: 0.00

Cancel

The currently selected panel is displayed with an option to Change Panel.

Select this button and then select the previously defined Polycarbonate or FRP panel and OK. The new panels are inserted and changed to the FRP material.

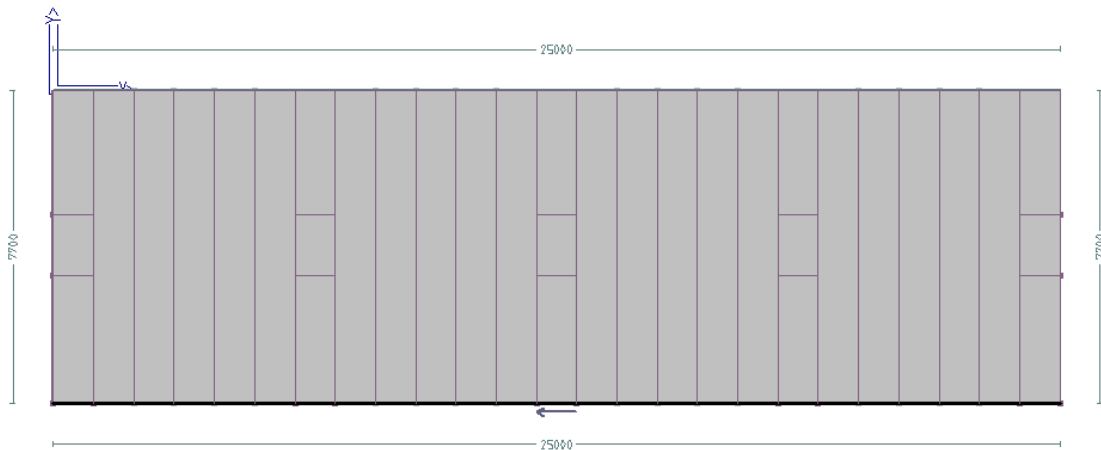
Select Roof Material

Ampelite	Corrugated	Wonder Glass	8.00
Ampelite	Lockdeck	Wonder Glass	8.00
Ampelite	Steel Clad	Fibreglass	8.00
Ampelite	Steel Clad	Wonder Glass	8.00
Ampelite	Steel Rib	Wonder Glass	8.00
Ampelite	Steel Span	Wonder Glass	8.00
Bluescope	Easyclad 2PF300	Cb	0.42
Bluescope	Easyclad 4P300	Cb	0.42
Bluescope	Longline	Cb	0.70
Bluescope	Longline	Cb	0.70
Bluescope	Longline	Za	0.70
Bondor	Steel Clad	Cb	0.75
Clix	Corrugated	Cb	0.42
Clix	Standing Seam	Painted	0.42
Devashish	Corrugated	FRP	0.42
Devashish	Corrugated	Galvanised	0.42
Fielders	Corrugated	Cb	0.42

Devashish Corrugated FRP 0.42

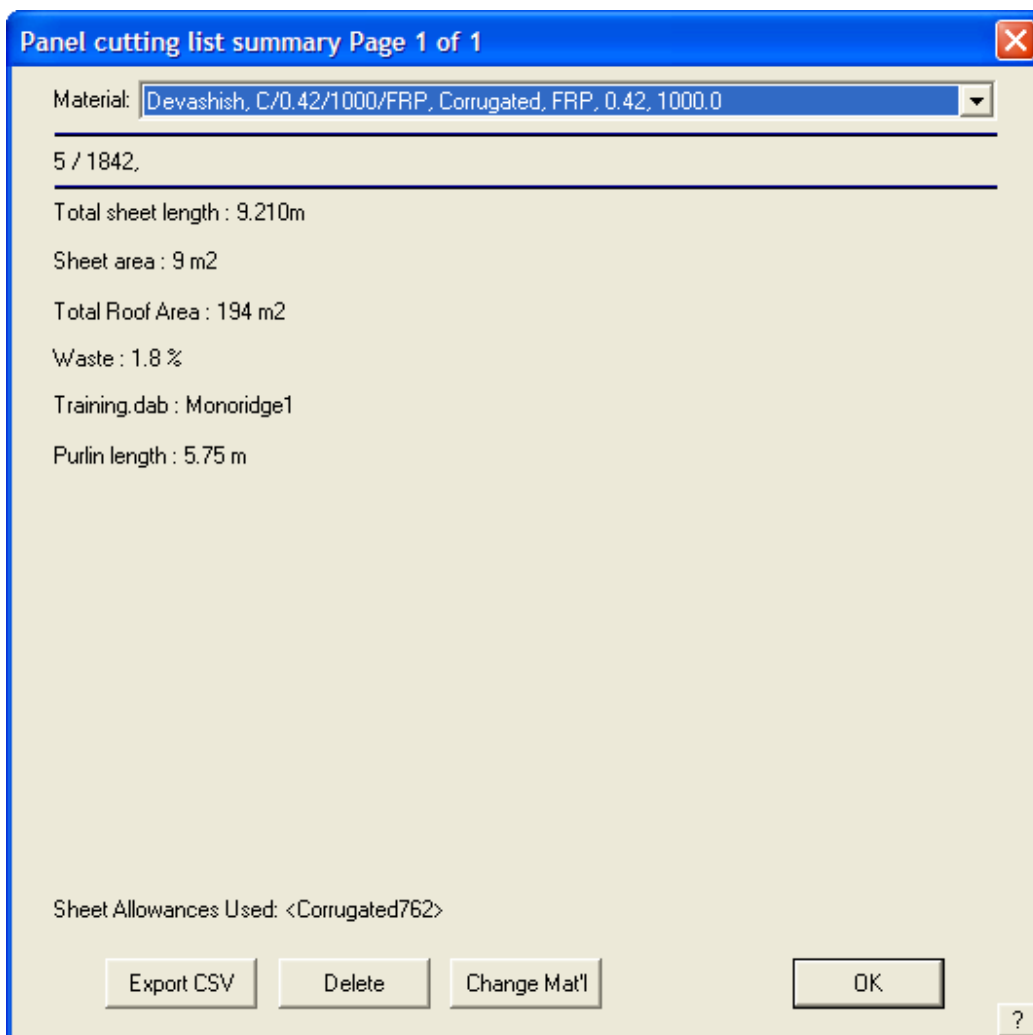
Cancel OK

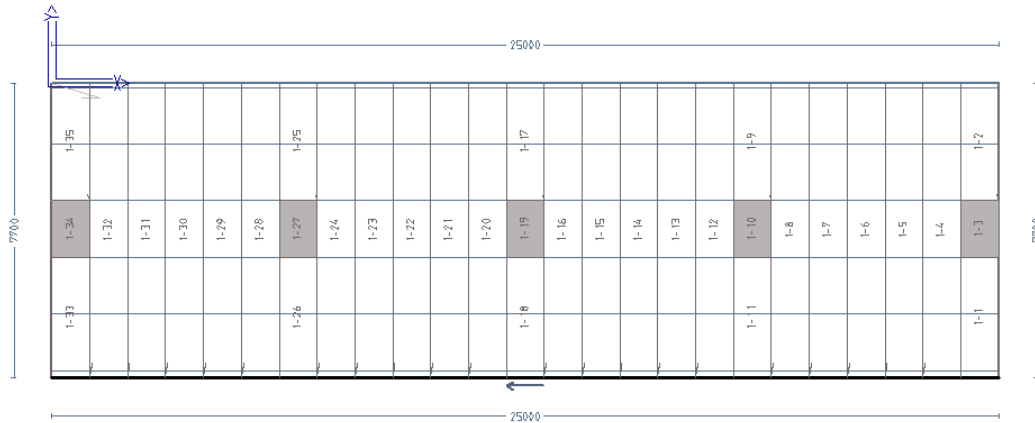
Once all have been selected, right click the mouse to indicate that the process is complete and then select the Show-All-Panels and the panels are displayed.



Select OK and the process is complete.

Now select **Estimate > Generate Panel Layout > Tally Panels** and you will have a cut list for all products on that roof. Below is the cut list for the FRP panels and the panels are displayed on our model. Selecting the down-arrow next to the list gives the option to review the list for each material type on the roof.





Panel cutting list summary Page 1 of 1

Material:

20 / 7776, 5 / 3333, 5 / 3303,

Total sheet length : 188.700m

Sheet area : 189 m2

Total Roof Area : 194 m2

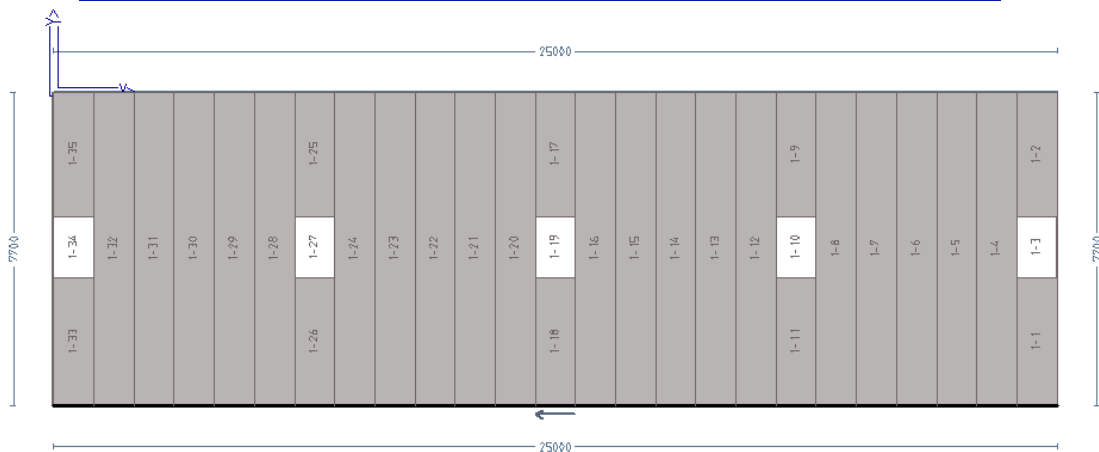
Waste : 1.8 %

Training.dab : Monoridge1

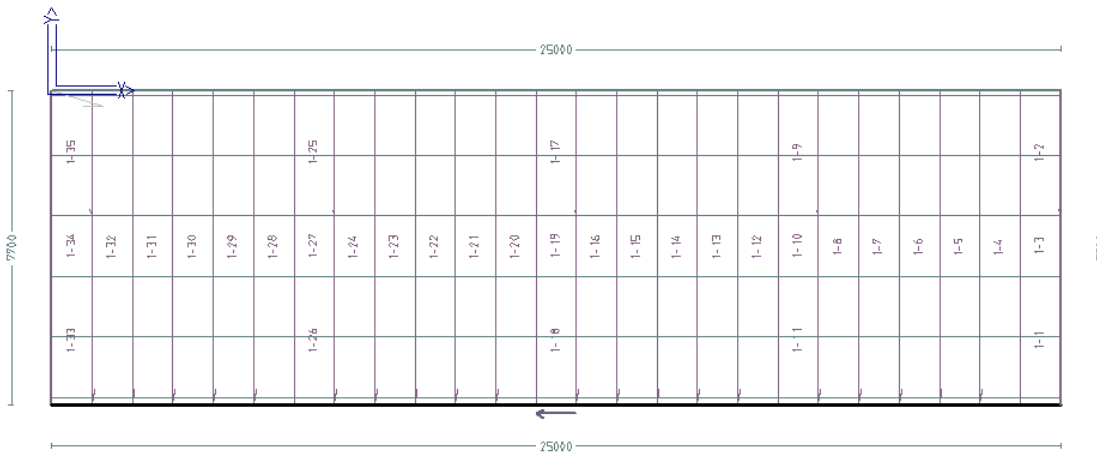
Purlin length : 144.25 m

Sheet Allowances Used: <Corrugated762>

Export CSV Delete Change Mat'l OK ?



The operator has total confidence that the correct panels are installed in the correct location. Each panel in the cut-list has a unique identifier and we know where on the roof it is to be installed. This information matches the cutting list generated as one of the printed reports.



Step 5 – Trim, Fixtures and Fittings.

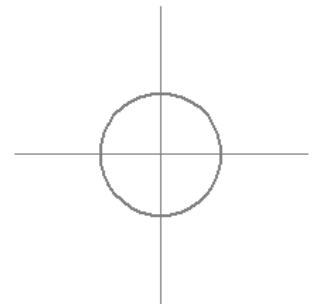
Fixtures

Any manner of roof fixture from skylights, access hatches to ventilators can be defined and added to the roof. Refer to the Reference Manual for the steps to defining a Fixture.

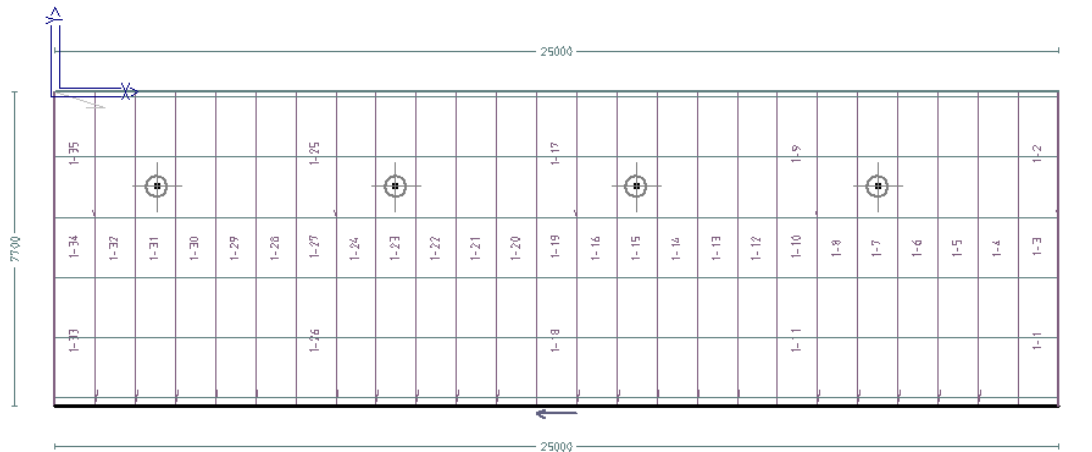
Once defined, they may be added wherever you need them on the roof. They usually are represented by a symbol, but may be drawn to exact scale with as much detail as you think you need. The symbol may also be imported as a CAD file using **File > Import > DXF**.

Save them to a folder that is easy to find in the \User folder – we use Fixtures.dab.

In our example, add three ventilators where required. In the process of defining the fixture, associating the graphic to it, you will also have added the required material to trim it off. Having also defined clips and accessories with the trim, these will be included in the take-ff automatically. The symbol below is what we used for a ventilator. You can draw any symbol you wish to represent the part to be installed.



Once 'installed' on the roof, we are done with these. The roof will show them with the symbol you defined, similar to the sketch below:



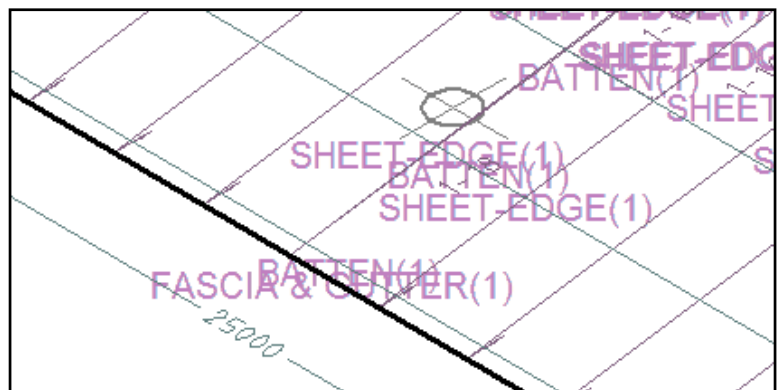
The fixtures and all accessory bits such as trim and trim accessories will be included when we **Report** the job.

Flashing and Trim

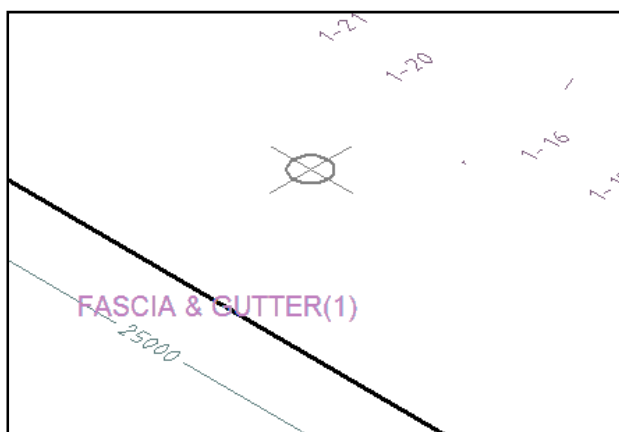
The last thing to do is apply the trim – the gutters and capping. These have been previously been defined under **Def-Materials > Flashing**. Refer to the Setup Guide for more details on setting up the flashing and accessories.

To ensure that you get the right trim on the right part of the roof, you must check the line types. It is the line type that determines the trim that is applied to which line. Every line in an AppliCad has a tag which identifies its purpose. Use **Tools > Show Line Types** to see what line is what.

When we **Zoom > Window** into the area at the front of the roof in our example, we can see that the default for the bottom edge has been defined as a Fascia and Gutter line. Other line types are also displayed. If the drawing is getting too busy with information, use **Tools > Set Display** to turn features on and off before you show line types.



Here we have turned off Battens and Sheets to make the drawing easier to interpret. The default line type at the eave is determined by the software based on the settings used when the roof is defined. The line types everywhere else are determined by the geometry of the roof.

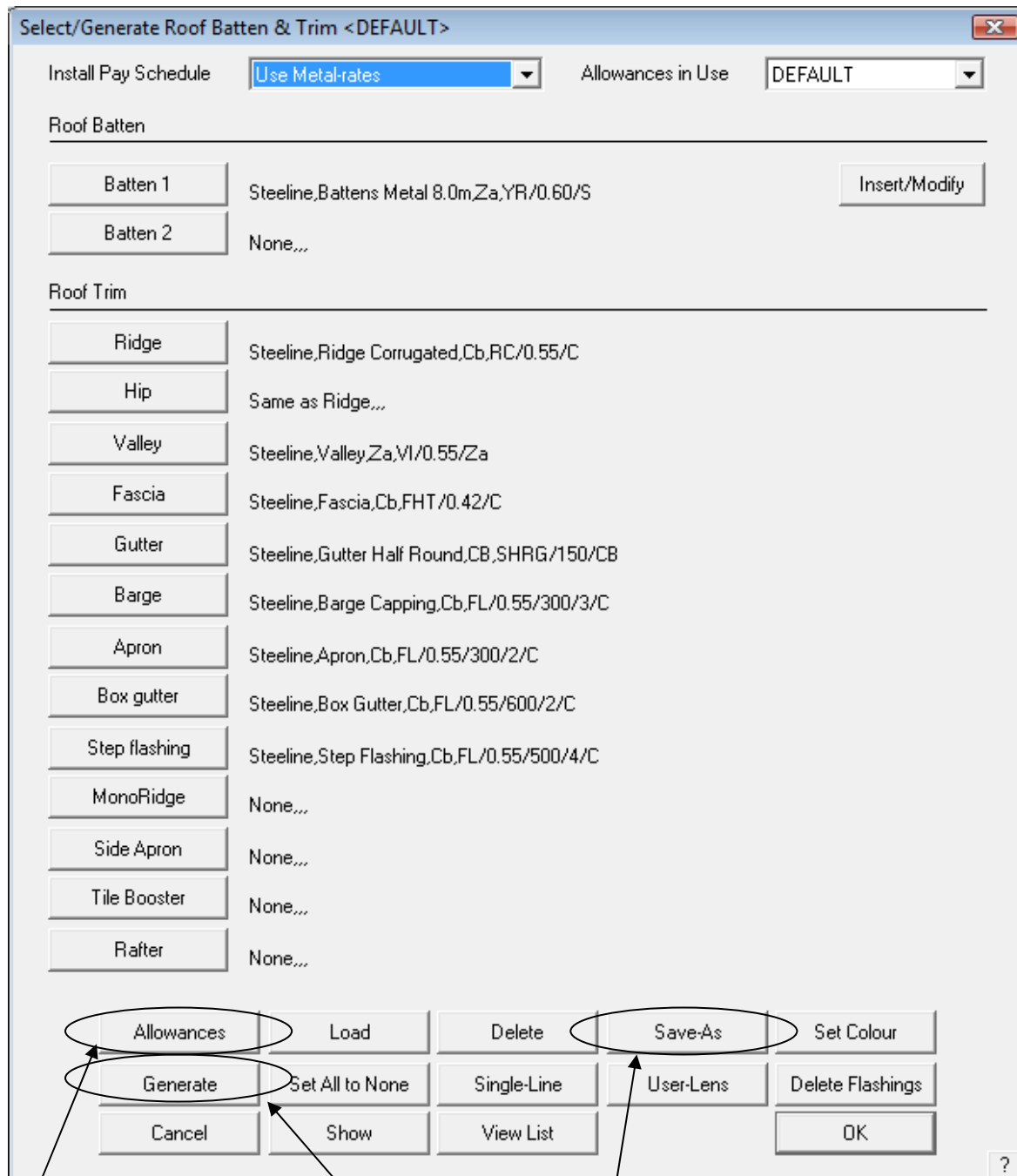


Each gable end will be identified as Gable End which would typically have rake or barge cap installed. The high side may be an apron (also known as Roof to Wall) if installed next to an existing building. If it is free standing then the top edge would be a ridge cap or more specifically a mono-ridge (where the ridge is formed at a tighter angle).

Use **Tools > Change Entity > Line Type** to set the lines to what is required, if necessary.

Once set, you are ready to apply material to the lines.

Select the **Cover > Flashing** option (as you did above to install the Battens). Now you deal with the line types listed. Select each line type in turn and select the required material from the list of previously defined trim options. You should end up with a list similar to that below:



Allowances button

Generate button

Save Button

If this list is likely to be a regular setup for your roof system, then you can save this for future use – click the **Save-As** button and define a new name. This list will be saved as a ‘trim system’ for future use on similar jobs.

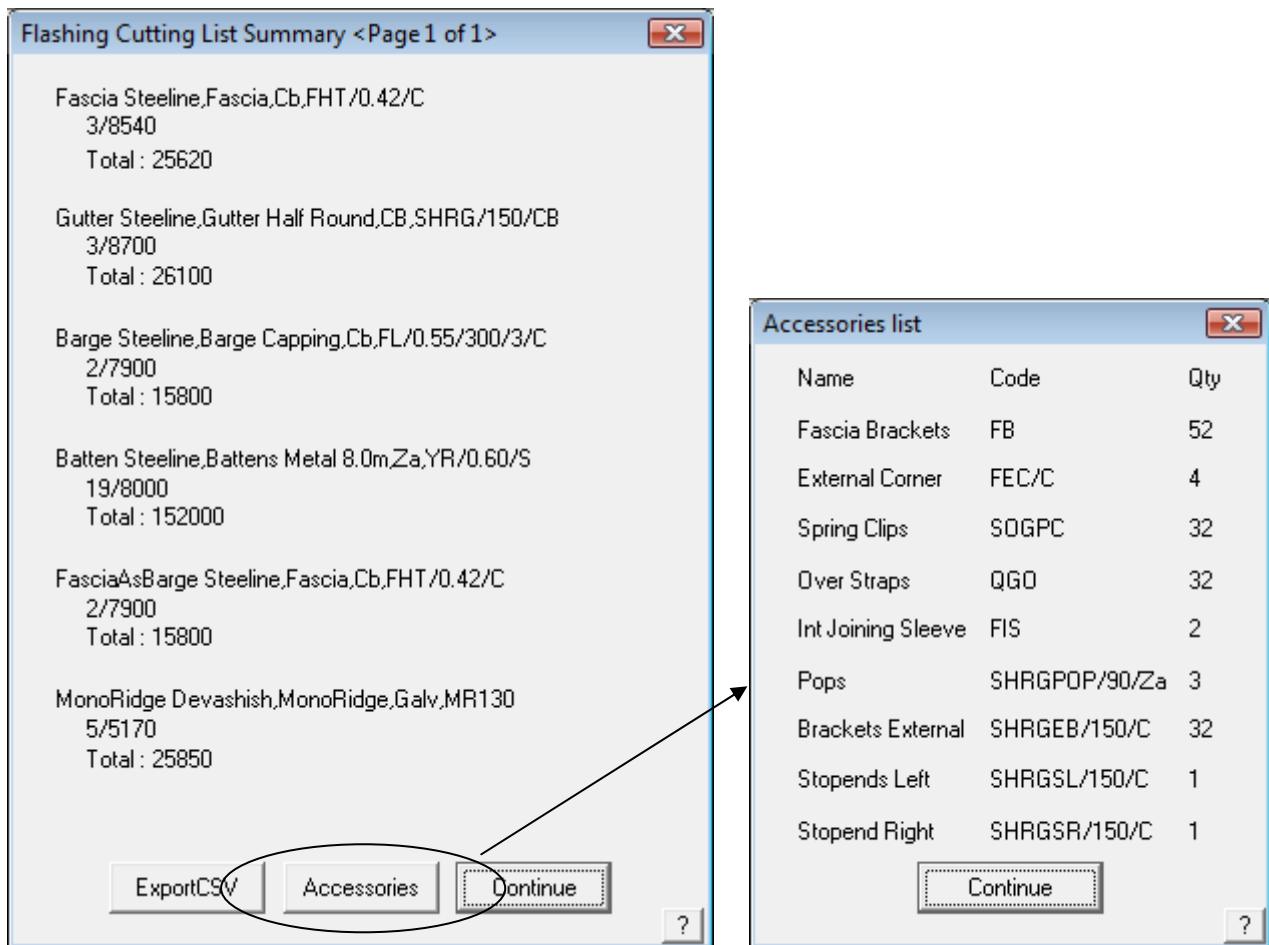
Part of the process of selecting your trim items is to check the allowances that must be applied to the process of generating the cutting list. Select the **Allowances** button and set the allowances that work for your product and roof system. You may then save this set of allowances and in so doing, create different allowance files the various roof systems in use. Below is a typical set of allowances. There is no standard for allowances as such – you set what works for your profiles and sections.

	Run Allowance	Lap Allowance	Internal Corner Allowance	External Corner Allowance
Ridge	125.00	85.00		
Hip	150.00	85.00		
Valley	350.00	85.00		
Barge	120.00	65.00		
Fascia as Barge	120.00	65.00		
Batten 1	150.00	50.00		
Batten 2	150.00	50.00		
Apron	120.00	50.00		
Box Gutter	200.00	75.00		
Step	250.00	75.00		
MonoRidge	250.00	150.00		
Side Apron	120.00	50.00		
Tile Booster	120.00	50.00		
Rafter	150.00	50.00		
Custom	200.00	100.00		
Gutter	300.00	50.00	150.00	350.00
Fascia	200.00	50.00	125.00	150.00
Combine Similar Length Flashings			50.00	
Minimum Run Length			100.58	
Round-off Flashings to Next (mm)			10.00	
Flashing Annotation - Text Size			2.50	

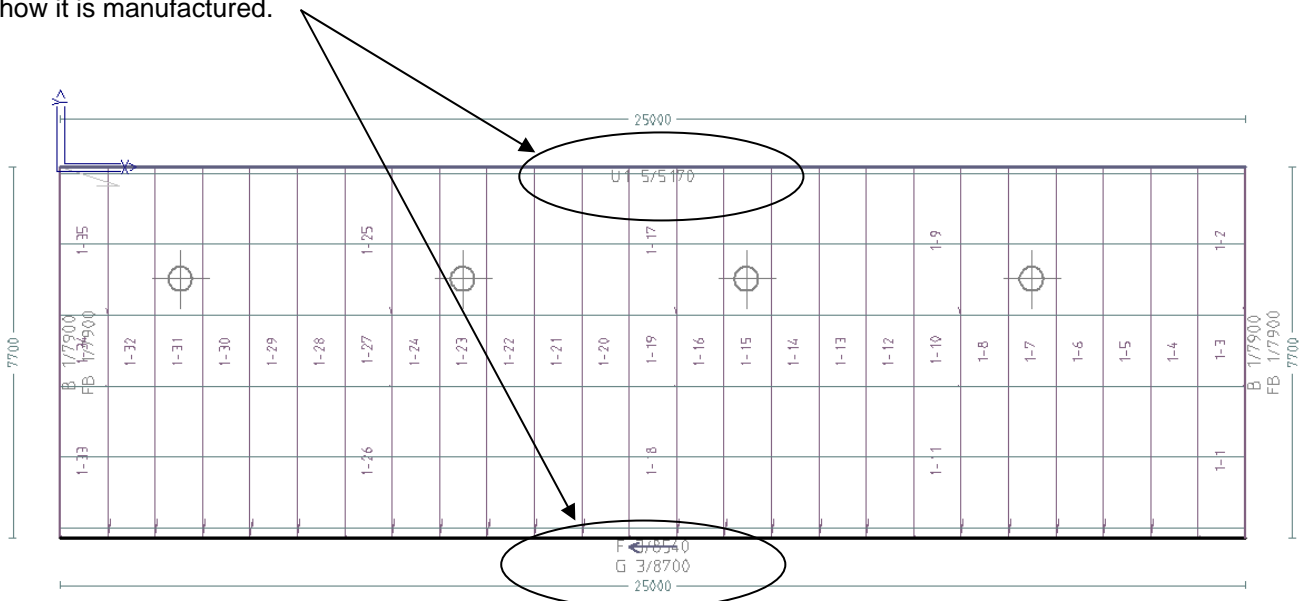
Buttons: Load, Delete, Save-As, Cancel, Single-Allow, OK, ?

Once the allowances have been set, select OK and the Trim screen is displayed again. Now select **Generate**. The software then applies the allowances to the lines and calculates the quantity of material, and

the appropriate accessories for that material. The entire cutting list is displayed and the roof plan drawing is annotated with the information about each piece. Select the Accessories button, and all the accessory components are also listed.



The annotation on the roof plan shows how pieces of what length based on how it is supplied to the job, ie how it is manufactured.

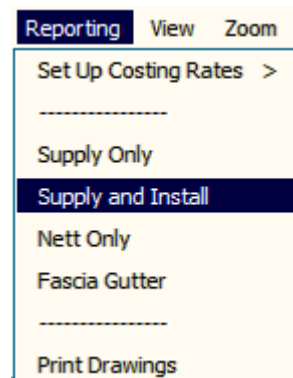


At this time, the quotation is all but complete.

Step 4 – Reporting and Material Lists

The final step in producing a quotation is to select **Reporting > Supply and Install**. This processes all the data in the job to create the summary of material costs and labour costs. The labour costs will have been defined ahead of time too. These are selected when the material is selected. Labour rates may also be defined with the material and will be displayed when the material is selected.

Please refer to the Reference Manual for more details on setting up pay rates. They are defined by selecting the **Set Up Costing Rates** option.



Supply and install Quote : <No-Name> Page 1 of 4

Category	Manufacturer	Description	Qty	Rate	SubTotal	Discount %	Total	
Delivery		Delivery	1.00	0.00	0.00	0.00	0.00	
Straight	Devashish	C/0.42/1000/FRP,Corrugated, FRP	9.21	15.00	138.15	7.50	127.79	
Straight	Devashish	C/0.42/1000/C,Corrugated, Galvanised	188.70	15.00	2830.50	7.50	2618.21	
Fascia	Steeline	FHT/0.42/C,Fascia, Cb	41.42	0.00	0.00	0.00	0.00	
Gutter	Steeline	SHRG/150/CB,Gutter Half Round, CB	26.10	0.00	0.00	0.00	0.00	
Barge	Steeline	FL/0.55/300/3/C,Barge Capping, Cb	15.80	0.00	0.00	0.00	0.00	
Batten	Steeline	YR/0.60/S,Battens Metal 8.0m, Za @ 8000	19.00	0.00	0.00	0.00	0.00	
MonoRidge	Devashish	MR130,MonoRidge, Galv	25.85	3.56	92.03	0.00	92.03	
Accessory	Steeline	FB,Fascia Brackets,Za	52.00	0.00	0.00	0.00	0.00	
Accessory	Steeline	FEC/C,External Corner,Cb	4.00	0.00	0.00	0.00	0.00	
Labour subtotal				657.23	Material subtotal		2838.03	
Labour markup				12.00	Material markup		10.00	
Labour total				736.10	Material total		3121.83	
							Job total (ex GST)	3857.93 =
							GST (10.00%)	385.79
							Total (incl GST)	4243.72

Buttons: Quote-Gps, Hide Qty=0, Chg. Desc, Delete, Add Item, Notes, Re-Calc, Save, Load, Print, Misc-Item, Fasteners, Add-Other, Tile-Waste, Cancel, ExportCSV, ExportGRIM, Set Suppliers, Set Finishes, Set Discount, Next-Page, OK

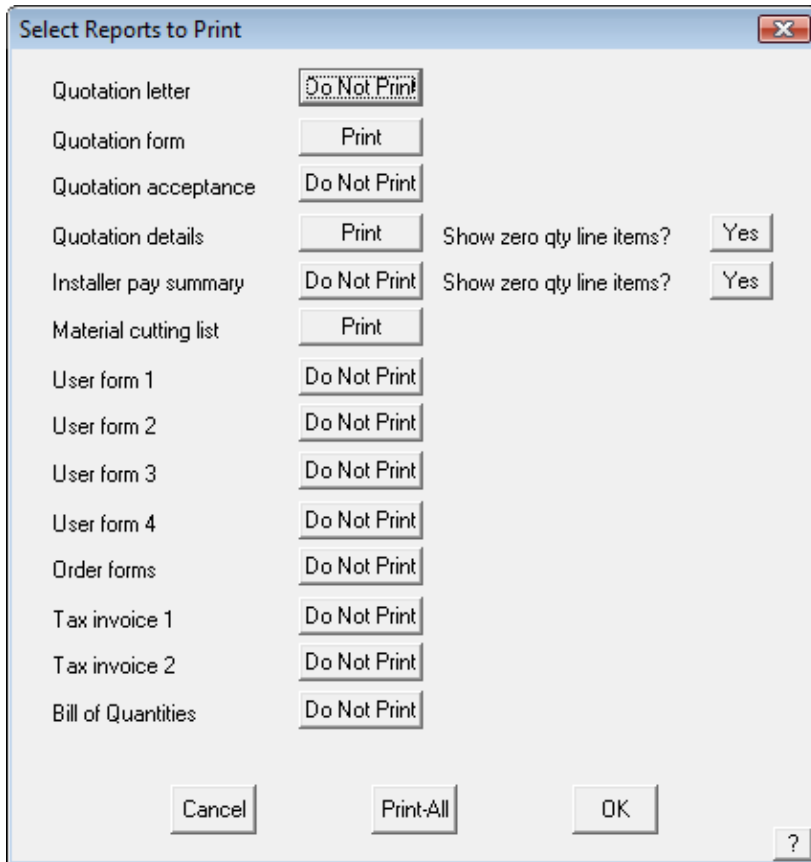
Miscellaneous materials may be added to the list of materials. These materials are typically items that you carry in inventory, are not a function of the roof size or shape, they are just things you need, such as Bin Hire. Things that you need on the job, and know the cost of. These are defined under **Materials > Misc Items** and selected under the **Misc-Items** button.

The **Add-Other** button allows you to add anything at all to the quotation. Such things that you might include here are such things as site clean, or site preparation etc.

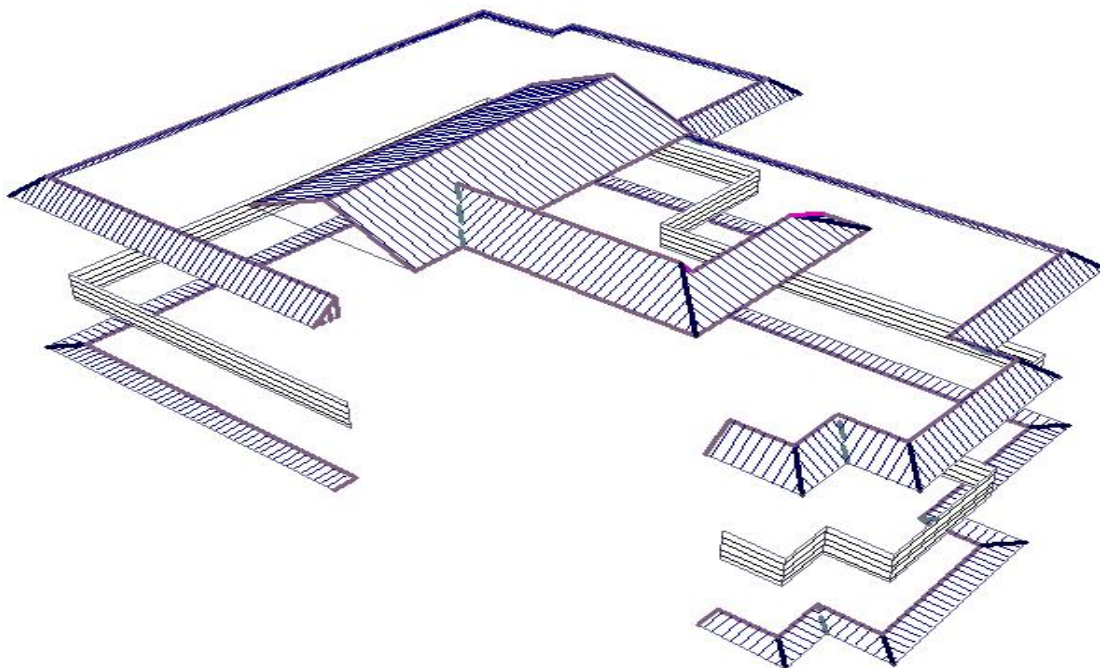
The Reference Manual explains in much more detail, the rest of the buttons on this box. The most usual step after adding required materials is the **Print** button. You have many reporting options and you simply select the particular report you need for this job at the stage you're at.

Notice that you have an option to show any line items in your quotation that have been determined to have zero quantity (they may have been defined and preselected as an Extra Item, but not required on this job).

The appearance, content and style of the standard **Templates** are defined by the operator to suit the requirements of the business. Defining and modifying Templates is covered in detail in the Reference Manual and a Tutorial on the AppliCad website under the Support page.



This process can be used to handle a simple job such as the one we have just completed right through to more complex estimating of jobs such as the one shown below:



Note: The secret to success of your use of AppliCad, is in the preparation and definition of the material lists and pricing files. You should be aware that this may be largely completed in Microsoft Excel if you have confidence in the use of Excel or any other spreadsheet system that views and edits *.CSV flat files. The model of the roof is the 'bones' or skeleton upon which the pricing is completed. Once the part definition is complete, an accurate 3D model becomes the start of the bid process. Accuracy is key, and once understood, your material lists and order forms will be exactly what is required to cover the roof.

The original sketch of this roof included an awning or head board. This may be completed by drawing it as a flat roof and applying materials etc as described above; or by using the optional Wall cladding module supplied by AppliCad. If the wall module is installed (what we call Warlock) then refer to the Reference Manual for details on completing the estimate including the wall panels and trim.

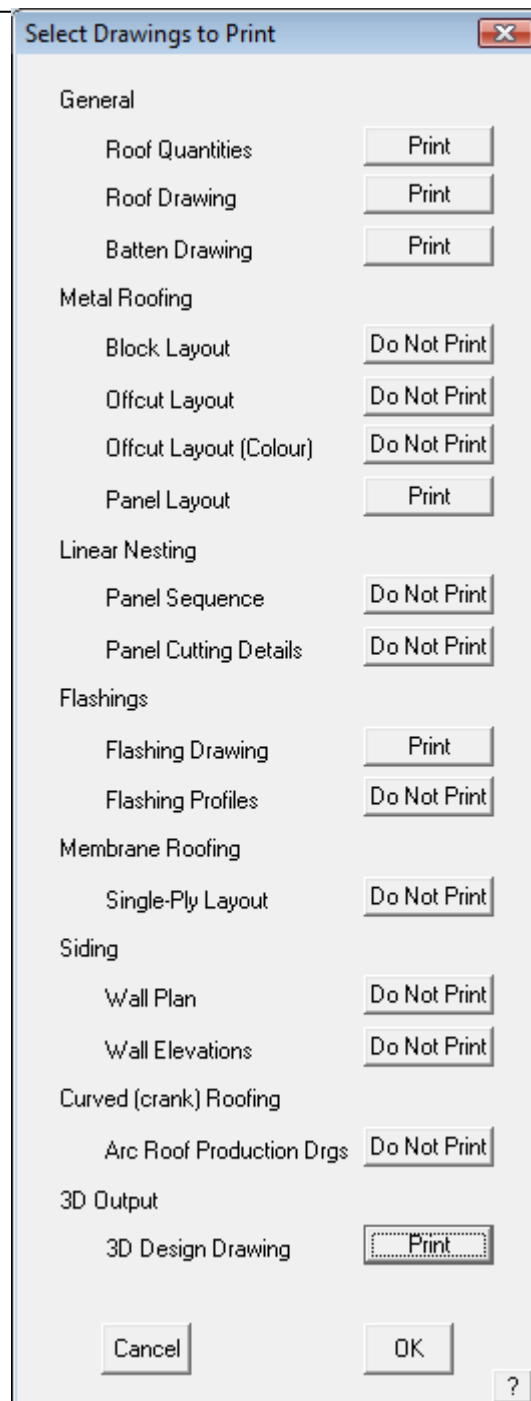
At this stage you also have the option of printing various drawing reports which includes a roof plan, flashing layout plan etc. Some examples are shown below.

Summary

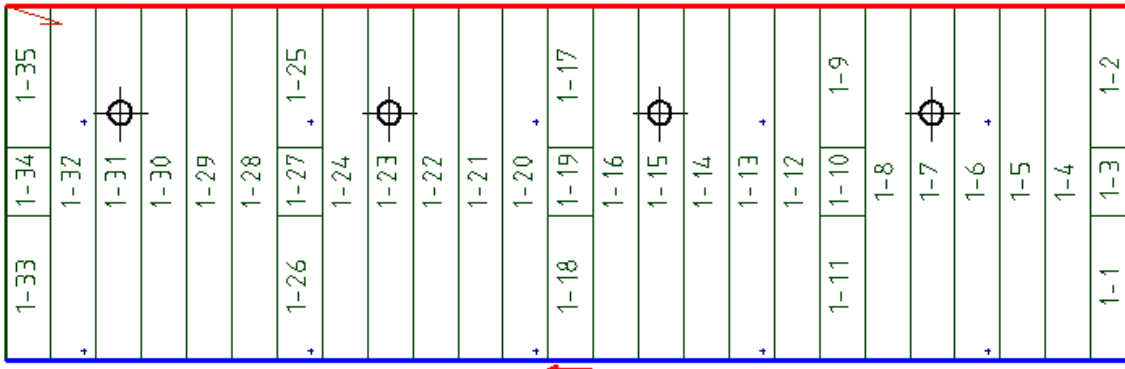
It will be observed that the primary purpose of the AppliCad software is preparing complete quoting and job management information for roofing and cladding as accurately and as efficiently as we can – right down to the last nut, bolt and screw.

Automatic tools have been created to speed up and improve the accuracy of this process. The automatic functions are not designed to produce fabrication or erection detail information.

Having stated this however, be aware that a full function 3D CAD program is installed and underpins the whole AppliCad process and is available to the operator to produce any 2D drawing or 3D model of anything you may conceive from an ant farm to space shuttle.



Sheet layout



Sheet Cutting List

Devashish, C/0.42/1000/C, Corrugated, Galvanised

Code	Length	Code	Length	Code	Length	Code	Length
1-2	3302	1-1	3332	1-9	3302	1-11	3332
1-17	3302	1-18	3332	1-25	3302	1-26	3332
1-35	3302	1-33	3332	1-4	7776	1-5	7776
1-6	7776	1-7	7776	1-8	7776	1-12	7776
1-13	7776	1-14	7776	1-15	7776	1-16	7776
1-20	7776	1-21	7776	1-22	7776	1-23	7776
1-24	7776	1-28	7776	1-29	7776	1-30	7776
1-31	7776	1-32	7776				

Devashish, C/0.42/1000/FRP, Corrugated, FRP

Code	Length	Code	Length	Code	Length	Code	Length
		1-3	1841	1-10	1841	1-19	1841
1-27	1841	1-34	1841				

Isometric View of Roof

