



metrotile
LIGHTWEIGHT ROOFING

STRUCTURAL ENGINEERING REPORT 10m SPAN STEEL FRAME ROOF

Client and Property Details

Property Address	N/A - Generic case study
Client Name	Metrotile UK Ltd
Client Address	Unit 3, Sheldon Business Park, Sheldon Corner, Chippenham, Wilts SN14 0RQ
Revision	1.0
Date	19 th September 2012
Report Reference	C120708

Synopsis

It was found that a weight saving of up to 20% by weight of timber and steelwork structural frame elements can be achieved by the use of light-weight Metrotile roofing as compared to a similar structure with standard concrete interlocking tiles.

Brief

Pinnacle was asked on behalf of Metrotile UK Ltd to evaluate the potential weight savings in structural elements achieved by the substitution of concrete roof tiles by Metrotile's Lightweight Roofing system.

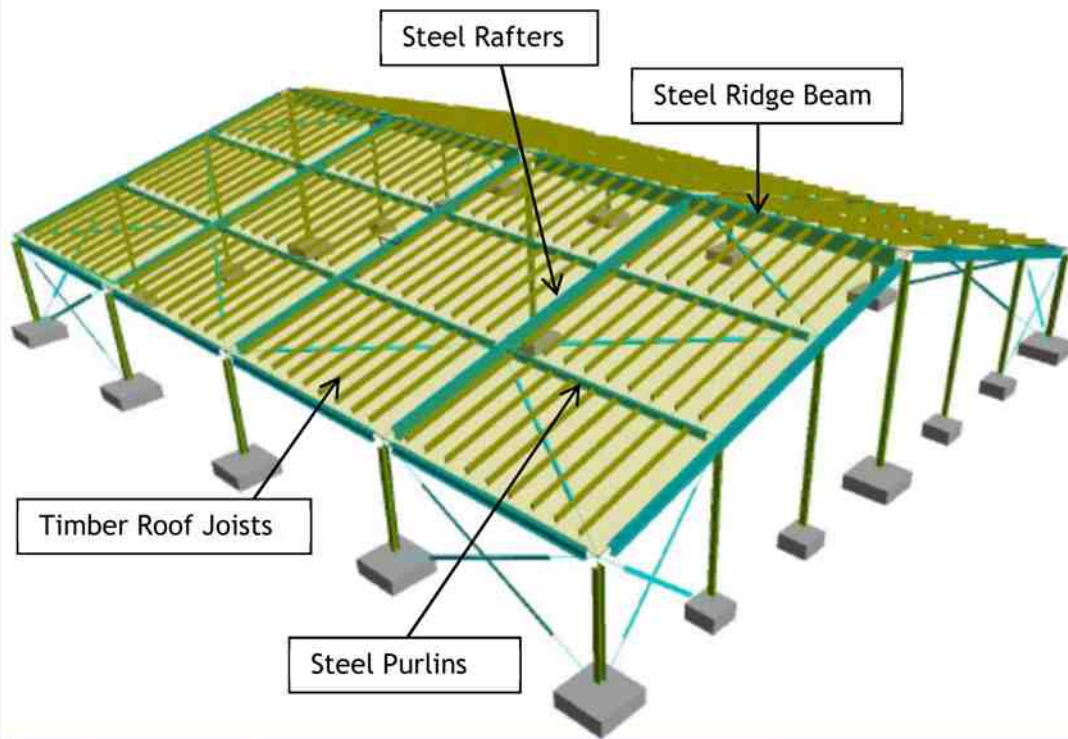
This case study was carried out for a building of typical proportions such as may be commonly encountered in the commercial/education sectors. This was based on a steel framed building having 10 metre clear span steel rafters at 6 metre centres supporting a 15° duo-pitch roof. The roof construction consisted of timber rafters at 600mm centres supporting either concrete tiles or the Metrotile alternative.

Roof Loadings

Concrete tiles/timber battens/felt underlay - VS	0.68 kN/m ²
Metrotile 0.45mm tiles/timber battens/felt underlay -	0.11 kN/m ²
Imposed/snow load	0.6 kN/m ²
Ceiling/insulation	0.15 kN/m ²

Analysis/Design

The steel and timber frame was analysed and designed using the 3D CSC Fastrak Building Modeller software. The roof was loaded with the concrete tile and then the Metrotile roofing systems and the resultant steel and timber structural section sizes compared as set out below:



Structural sizes comparison:

	Concrete Tile Roof	Metrotile Roof
Timber Roof Joists @600 CTS	47x175 C16	44x147 C16
Steel Purlins	203x133UB25 S355	178x102UB19 S355
Steel Rafters	356x171UB51 S355	305x165UB40 S355
Steel Ridge Beam	533x210UB82 S355	457x152UB60 S355

Conclusions

It is immediately evident that the roof tile load is reduced from 69 kg/m² to 12 kg/m² when comparing the Metrotile roofing system with standard tile loadings. For a steel framed building this has a significant impact on the size of the structural elements and a saving in material quantities and of course costs. For the building studied in this example the weight savings are set out below:

Total Material Weight Savings:

Timber Rafters: Total weight, kg

Concrete Tile Roof	=	2,300
Metrotile Roof	=	1,850
% weight saving	=	19.6%

Steel Frame: Total weight, kg

Concrete Tile Roof	=	11,600
Metrotile Roof	=	9,400
% weight saving	=	19.0%

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