

## Technical Note

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To: Dave Raval

Company: Loftzone Ltd

Project Name: Loftzone – “Cut-Roofs”

Project Manager: Nick Ash

Project Number: 63210323

Technical Note No: TN01

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### 1 Introduction

Loftzone Ltd have produced a raised loft platform system called “Storefloor” to enable an attic storage platform to be installed above loft insulation.

Loftzone Ltd have appointed Sweco UK Ltd to provide structural engineering advice in connection with traditional “Cut-Roofs”, typical of domestic properties prior to the use of trussed rafters introduced in the late 1960’s.

### 2 “Cut Roof” Construction

Traditional cut-roofs are frequently found in older properties and were particularly common in properties constructed after the Second World War until the advent of punched metal plated timber roof trusses.

Their design generally falls into the following elements:

- Principal Truss – usually around 6ft (1.8m) to 8ft (2.4m) centres.
- Canted or Vertical Purlins – supporting common roof rafters
- Ceiling Binders – supporting ceiling joists
- Common Roof Rafters – spanning between eaves and purlin, generally at 400mm to 450mm centres
- Common Ceiling Joists – spanning between eaves and ceiling binders, also generally at 400 to 450mm centres.

The above typical arrangement is shown in SK/001.

The Principal Truss takes on many forms and many variants exist. In older properties these may take the form of a King Post Truss. After the Second World War, these were typically based on information provided, at the time, by the Timber Development Association (TDA) and were generally referred to as TDA designs. The designs were not engineered in the sense that structural calculations were prepared but were based on load testing of full size examples. Designs were “tight” due to the premium on raw materials after the war with economy of paramount importance. A typical Principal Truss is illustrated in SK/002.

### **3 Common Ceiling Joists in “Cut-Roof” Construction**

Ceiling Joists for “cut-roof” construction were often sized according to standard published tables. In subsequent years, these Tables were reproduced in Part A of the Building Regulations. In more recent years, these have been reproduced by TRADA in their publication, “Span Tables for Solid Timber Members in Floors, Ceilings and Roofs for Dwellings”.

The tables indicate a Dead Load and an Imposed Load and provide maximum spanning capacity for a particular size and spacing of joist and grade of timber.

The tables are similar over the years, but a typical 100mm x 50mm SC3 (C16) ceiling joist at 400 centres is capable of spanning in the order of 2m. (See Appendix A for Table Extracts).

Ceiling joists will be combined with Ceiling Binders. A typical 75mm x 175mm SC3 (C16) ceiling binder is capable of spanning in the order of 2.6m (See Appendix A for Table Extracts)

The Ceiling Binders are in turn supported by loadbearing walls or by Principal Trusses, as outlined above.

The common element in all of the above is that the superimposed loading allowable on top of the ceiling joist is 0.25kN/sq.m, which is common to all attic roof spaces.

### **4 Conversion of “Cut-Roofs” to accommodate Storefloor Installations**

Loftzone’s Storefloor system enables a platform to be installed above the insulation. As the existing ceiling joists on a “Cut-Roof” are designed to support an imposed load of 0.25kN/sq.m, it also means that Storefloor can also support an imposed load of 0.25kN/sq.m (25kg/sq.m). There is a small increase in dead loading from the flooring (equivalent to around 0.15kN/sq.m), but this is likely to be accommodated within the total dead load allowance within the span tables referred to above.

### **5 Conclusion**

Storefloor is suitable for use in traditional “Cut-Roof” scenarios for the use of providing a platform for attic storage.

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Job No. 65210323

Drawing Ref. SK/001

Calc. No.

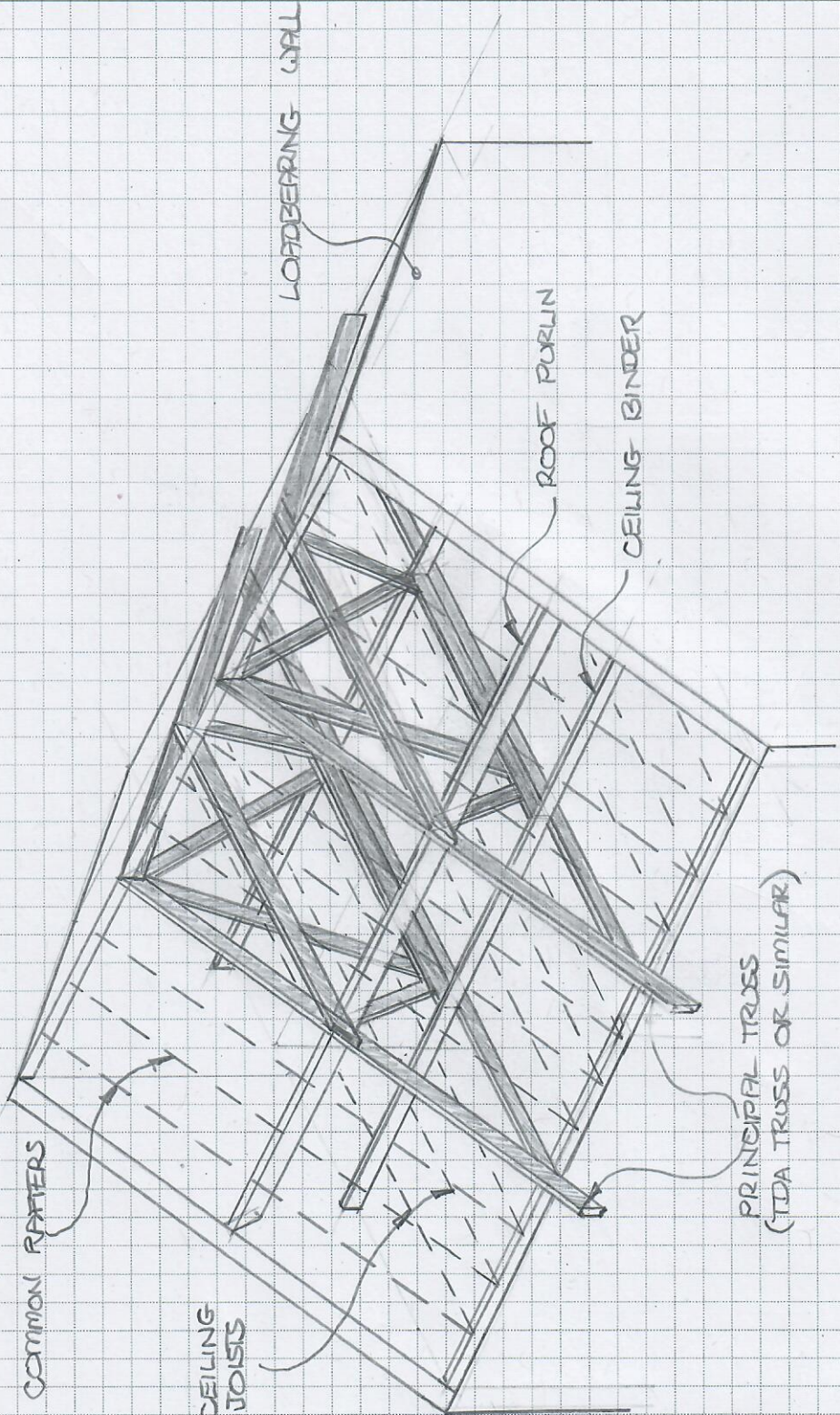
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Project LOFTZONE

Calculation by *MS*

Description TYPICAL 'CUT-ROOF' ISOMETRIC

Date 15/04/25

REF:	Calculations	Output
		<p>TYPICAL 'CUT-ROOF' ISOMETRIC</p>

Please initial as checked if not attached to cover sheet.

Job No. 65210323

Drawing Ref. SK/002

Calc. No.

Page

Project LOFTZONE

Calculation by NSI

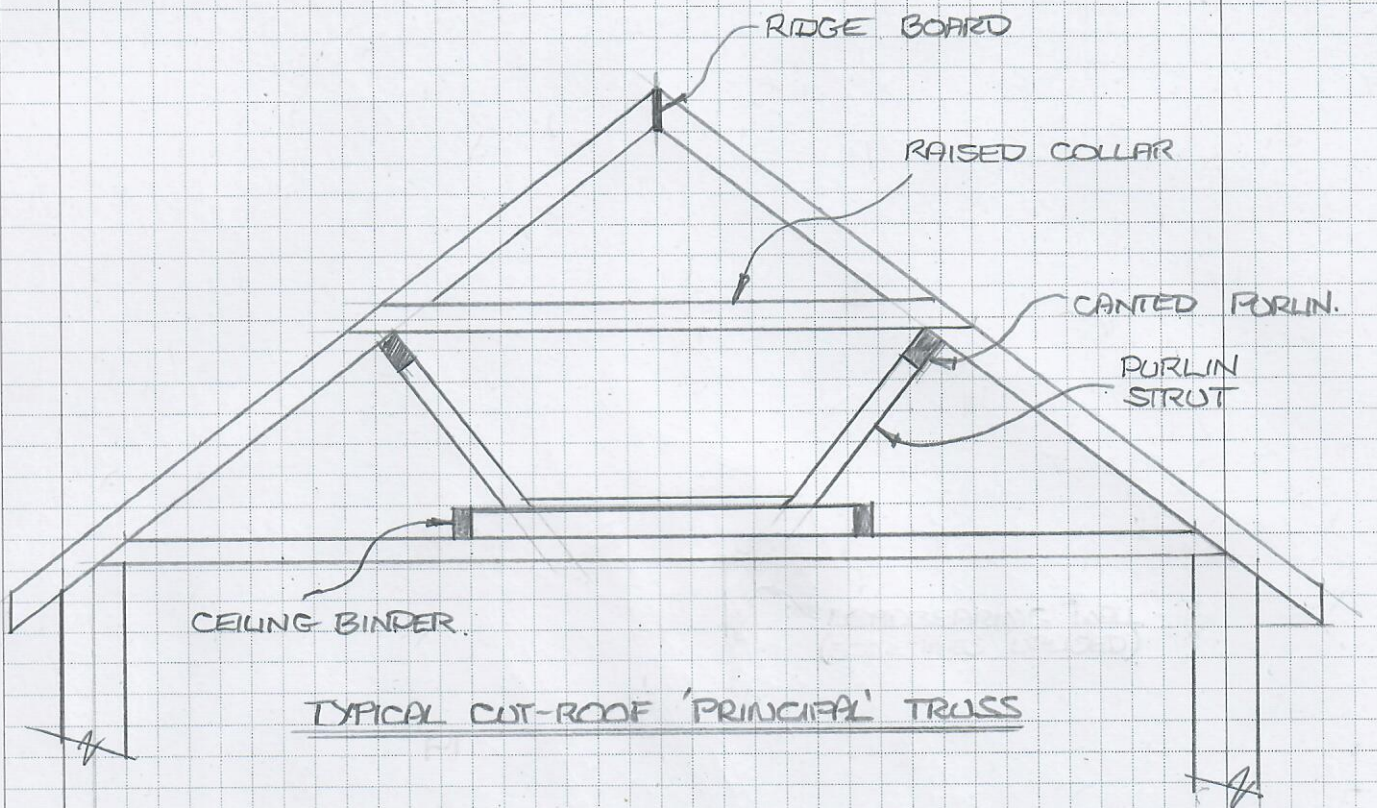
Description TYPICAL CUT-ROOF 'PRINCIPAL' TRUSS

Date 15/04/25

REF:

Calculations

Output



Appendix A

Table Extracts from “Span Tables for Solid Timber Members in Floors, Ceilings and Roofs for Dwellings” published by TRADA Technology in 2004.

<b>Table 8 Permissible clear spans for ceiling joists</b>								
Imposed load not exceeding 0.25 kN/m <sup>2</sup>								
Strength Class C16			Service Class 1 or 2					
		Dead load (kN/m <sup>2</sup> ) excluding self-weight of joist						
		Not more than 0.25			More than 0.25 but not more than 0.5			
Size of joist		Spacing of joists (mm)						
Breadth (mm)	Depth (mm)	400	450	600	400	450	600	
		Maximum clear span (m)						
38	72	1.15	1.14	1.11	1.11	1.10	1.06	
38	97	1.74	1.72	1.67	1.67	1.65	1.58	
38	120	2.33	2.29	2.21	2.21	2.17	2.08	
38	145	2.98	2.94	2.82	2.82	2.76	2.62	
38	170	3.66	3.60	3.43	3.43	3.36	3.18	
38	195	4.34	4.26	4.05	4.05	3.97	3.74	
38	220	5.03	4.93	4.68	4.68	4.57	4.30	
47	72	1.27	1.26	1.23	1.23	1.22	1.18	
47	97	1.93	1.90	1.84	1.84	1.81	1.74	
47	120	2.56	2.52	2.43	2.43	2.38	2.27	
47	145	3.27	3.22	3.08	3.08	3.02	2.87	
47	170	4.00	3.93	3.74	3.74	3.67	3.46	
47	195	4.73	4.64	4.41	4.41	4.31	4.07	
47	220	5.47	5.36	5.08	5.08	4.96	4.67	
ALS/CLS								
38	89	1.55	1.53	1.49	1.49	1.47	1.41	
38	140	2.85	2.81	2.69	2.69	2.64	2.51	
38	184	4.04	3.97	3.78	3.78	3.70	3.49	

Table 10 Permissible clear spans for ceiling binders													
Imposed load 0.25 kN/m <sup>2</sup>													
Strength Class C16      Service Class 1 or 2.													
Size of binder		Dead load (kN/m <sup>2</sup> ) excluding self-weight of binder and ceiling joist											
		Not more than 0.25						More than 0.25 but not more than 0.5					
Breadth    Depth (mm)      (mm)		Spacing of binders (mm)											
		1200	1500	1800	2100	2400	2700	1200	1500	1800	2100	2400	2700
		Maximum clear span (m)											
47	150	2.20	2.08	1.99	1.91	1.84		2.01	1.89	1.80			
47	175	2.63	2.49	2.37	2.27	2.19	2.11	2.39	2.25	2.14	2.04	1.96	1.89
63	125	2.00	1.90	1.82				1.84					
63	150	2.48	2.35	2.24	2.15	2.07	2.00	2.26	2.13	2.03	1.94	1.86	
63	175	2.95	2.79	2.66	2.55	2.46	2.37	2.69	2.53	2.40	2.29	2.20	2.12
63	200	3.43	3.24	3.08	2.95	2.84	2.74	3.11	2.92	2.77	2.65	2.54	2.45
63	225	3.91	3.68	3.50	3.35	3.22	3.11	3.54	3.32	3.14	3.00	2.88	2.77
75	125	2.15	2.04	1.95	1.88	1.81		1.97	1.86				
75	150	2.65	2.51	2.40	2.30	2.22	2.15	2.42	2.28	2.17	2.07	1.99	1.92
75	175	3.16	2.98	2.84	2.72	2.62	2.54	2.87	2.70	2.56	2.45	2.35	2.27
75	200	3.66	3.45	3.29	3.15	3.03	2.93	3.32	3.12	2.96	2.83	2.71	2.62
75	225	4.16	3.93	3.73	3.57	3.44	3.32	3.77	3.54	3.36	3.20	3.07	2.96