

DEM Design. Engineering. Manufacture.

“Supporting the Steel Framing Industry”

Light Gauge Steel Portal Frames 12 & 20m Span



“Supporting the Steel Framing Industry”

DEM is the combination of the knowledge of three well established companies that are working together to make the transition to using Light Gauge Steel Construction easier to handle.

Hill Cannon (UK) Limited

Hill Cannon (UK) Limited is a leading Civil and Structural Engineering Consultancy which have been in practice for over forty years. They have a dedicated Modern Methods Department which is at the cutting edge of Light Steel Framing design, with over ten years experience in the area, as well as other MMC methods. The Modern Methods Department, with the SCI, is already developing designs to the upcoming Eurocodes (EC3, due out in March 2010) to gain the most competitive advantage they can for you, our client.

Howick Ltd.

Howick have been building rollforming equipment for over 30 Years. Their focused Framing Machines are designed to quickly produce accurate load bearing frames that allow the production of multi story structures. Howick offer a customisation of tooling to suit your specific needs where required.

Vertex

Vertex is the leading building design software that allows full design of all components from the foundation to the walls, floors and roof design. Design is made easy with various automated features as well as a library of building components that allow the designer a high degree of flexibility to take both the exterior and interior to a fully finished state including furnishings. Vertex then has an automated and custom link to the Howick Rollforming machine to turn accurate building design into accurate production.



What can DEM do for you?

We do not propose to do all the work for you but we do make three of the largest components of your business easier. By offering our knowledge in each of our specialist areas.

The three main questions we answer are:-

How do I take those initial plans from concept to production ready designs?

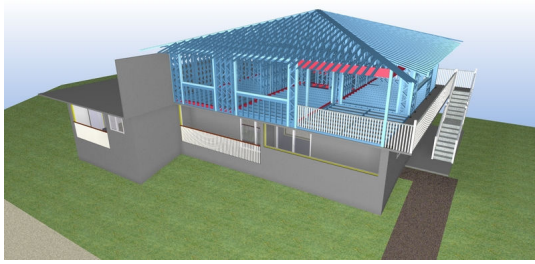
How do I make sure the designs meet the required standards and codes?

How do I produce the framing components and what equipment do I need?

Typical offering from DEM

Vertex supply the Software, Technical Support and Training for the use of their software package.

As required additional customisation of the software is available for the optimisation of you system as it evolves.



Hill Cannon supply technical manuals that include the standard details needed to correctly finish the structure to building standards such as NHBC Chapter 6.10 and SCI P301. (Sample Pages Below.)

As well as offering complete structural calculations for the project, including above and below ground works, thus offering a one stop solution for the whole project.

Structural and Building Physics Performance

3.3 Typical Applications in Buildings

3.3.1 Application – Wall Frames

Wall frames are manufactured as 3-dimensional panels consisting of:

- Rafters (automatically oriented) at 90° or 60° non-constant, or as modified in openings;
- Beams and top rails which fit around the rafters;
- Rafters (and stiffeners) at full height of the wall to provide lateral restraint;
- Bracing rafters as integral C-sections between the rafters or as cross-brays fixed externally to the walls (see Figure 4.3)

Figure 4.2 Typical wall frame cross-sections

Wall frames are usually designed as load-bearing, and also to resist wind loads when used on the exterior of the building.

3.3.2 Application – Cold Walls

Wall frames are used to form cold walls in multi-storey buildings either as:

- Supporting walls for accurate insulation and fire compartmentation;
- External walls in a 'habitable' envelope.

They are not subject to significant vertical loads, but may be exposed to high wind loads, depending on the building location and height.

Generally, 75 mm deep C-sections are used for floor-ceiling heights of up to 3.0 m or less in multi-storey buildings. Figure 4.3 shows a typical cold wall section between floors. The spacing of the wall ties to which the insulation depends on the wind load (in building situation and exposure). The minimum requirement is 0.75 kN/m². If the wall is to be used for external cladding, supported, additional wall ties are given in Annex 2.

Structural and Building Physics Performance

Figure 4.4 Section through cold wall

Insulation is commonly laid over rafters located in vertical framing systems when it is not possible to separate out the rafters. The density of wall tie is required to be minimum of 3.70 kg/m³. Wall ties should extend vertically to the full 600 mm depth with wall ties at subsequent vertical spacing of 375 mm (plus tie centres reduced to 225 mm at openings).

4.3 Other bracing systems

A variety of bracing systems may be used such as isolated systems. Two alternative systems may be selected, normally used singly combined, the difference being illustrated in Figure 4.2 and Figure 4.3. EN1995 requires the use of a rafter system in racking, although the racking system has performed well for over 35 years' use in the UK.

Minimum values for racking resistance:

Minimum	= 20kN
Medium	= 30kN
Other buildings	= 50kN

HILL CANNON

GENERAL HOUSE DESIGN

DATE: 27/11/2008

LINTEL DETAIL

LINTEL ABOVE WINDOW / DOOR / FURROW

Thickness of self build	100	1120	
Width of opening	100	1120	
Self build support on wall	100	1120	1120
Self build support on floor	100	1120	2360
Thickness support on wall	100	1120	1120
Thickness support on floor	100	1120	1120

Based upon the 100 mm thick self-build masonry.

Strength:

Self-build on wall	100	1120	1120
Self-build on floor	100	1120	1120
Self-build on wall	100	1120	1120
Self-build on floor	100	1120	1120
Self-build on wall	100	1120	1120
Self-build on floor	100	1120	1120

Howick supply the frame making machinery for producing walls floors and truss components. Along with the training and support needed to help companies new to the processes involved in producing their own framing components.



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 www.hillcannon.com
 Contact: Steve Napper

Howick Ltd
 01423 888291
 www.howickltd.com
 Contact: Nick Coubray

Vertex UK
 01423 500211
 http://uk.vertex.fi
 Contact: Jouni Kyllonen

“Supporting the Steel Framing Industry”

DEM Package 1 (Low Rise)

- 2 Seats Vertex BD FRAMER.
- Vertex Training (3 days), Technical Support and 1st years maintenance.*
- SCI Technical manual.
- Standard Details Documentation.
- 75 Hours of Engineering consultancy from Hill Cannon (UK) LLP including 1 UK Site visit / attendance of a design meeting.
- Indicative design cost estimation documents.
- Howick 89mm or 100mm H500 Framing machine and Decoiler installed and operator training provided.
- 2 additional visits to your site by a Howick technician for additional training and maintenance.**

DEM Package 2 (Medium Rise)

- 2 Seats Vertex BD Pro.
- Vertex Training (4 Days), Technical Support and 1st years maintenance.*
- SCI Technical manual.
- Standard Details Documentation.
- Indicative design cost estimation documents.
- 110 Hours of Engineering consultancy from Hill Cannon (UK) LLP including 1 European Site visit / attendance of a design meeting.
- Howick 89mm or 100mm H500 Framing Machine and Decoiler installed and operator training provided.
- Howick 150mm H500 Framing Machine and Decoiler installed and operator training provided.
- 2 additional visits to your site by a Howick technician for additional training and maintenance.**

DEM Package 3 (Medium Rise)

- 2 Seats Vertex BD Pro Including G4 add on.
- Vertex Training (4 + 2 Days), Technical Support and 1st years maintenance.*
- SCI Technical manual including Floor Joist.
- Standard Details Documentation.
- Indicative design cost estimation documents.
- 110 Hours of Engineering consultancy from Hill Cannon (UK) LLP including 2 European Site visits / attendance of design meetings.
- Howick 70 or 150mm H500 Framing machine and Decoiler installed and operator training provided.
- Howick 89mm or 100mm H500 Framing machine and Decoiler installed and operator training provided.
- Howick 250mm H600 Floor Cassette Machine and Decoiler installed and operator training provided.
- 2 additional visits to your site by a Howick technician for additional training and maintenance.**

Additional Options

- Vertex G4 package.
- Contract vertex design service.
- Additional Engineering Consultancy hours from Hill Cannon (UK) LLP.
- Howick maintenance contract.
- Additional Howick Machine tooling customisation.

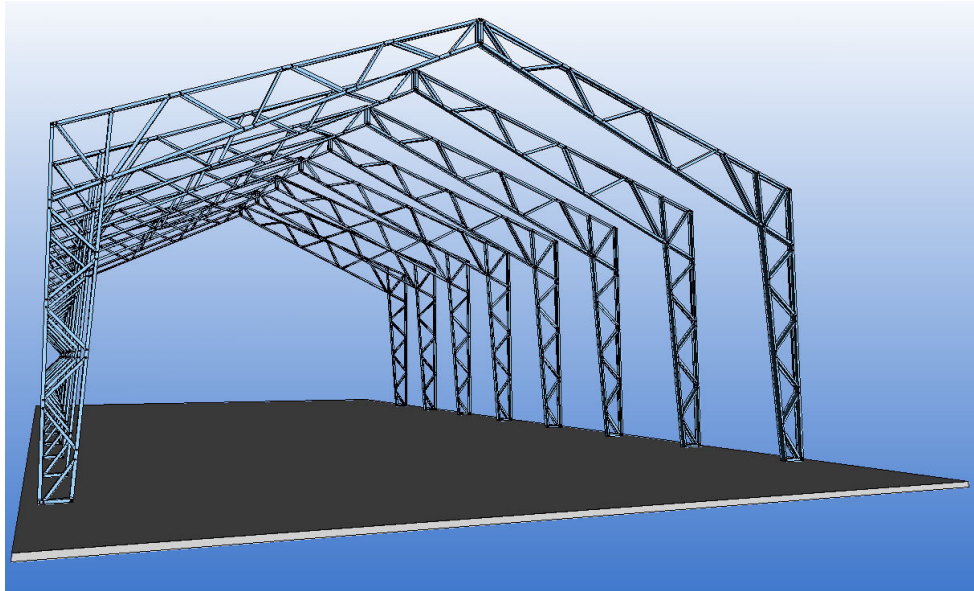
*Training at Vertex’s offices, training available onsite with Travel Costs additional.

**Travel and Parts additional.

OVERVIEW

Sample designs have been carried out and are included to the rear of the report in the Appendix.

The essence of the designs is that rather than use solid hot rolled sections rafters are assembled from sections of light gauge steel into lattice trusses or 'scissor frames' as shown in the image below.



3D render of Scissor Truss

Span	Profile	Frame Centres
12m	75	1.25m
20m	75	0.45m
20m	107	1m

Using the 75mm profile the frames are set at the required centres of between 1.25m for the 12m option and 0.45m for the 20m option. Both of which are close enough such that cladding rails are NOT required. The external (composite) cladding can be directly fixed to the outside faces and the internals clad with plasterboard (or similiar) IF required for finished building.

The analysis carried out is based upon the 'typical' 75mm profiles and the frames need to be at the centres noted above.

If a squatter, 107 x 65 x 1.6mm profile is used it has sufficient strength for the 20m spanning frame to work at 1.0m centres. The latter section actually uses approximately 50% less steel due to the increased centres than the 75mm profile for the 20m case.