## Types of portal frames

Many different forms of portal frames may be constructed. Frame types described below give an overview of types of portal construction available.

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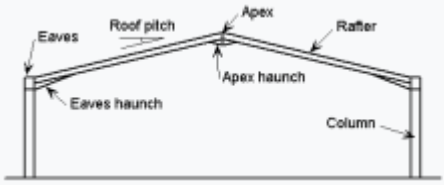
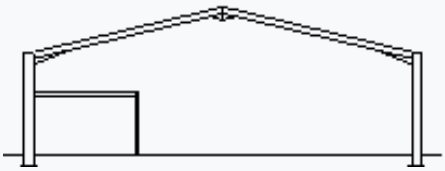
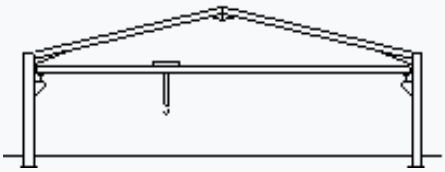
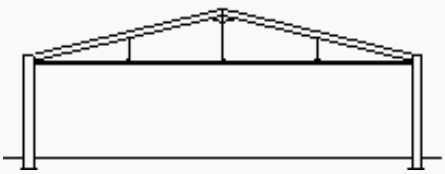
|  | **Pitched roof symmetric portal frame**<br>Generally fabricated from UB sections with a substantial eaves haunch section, which may be cut from a rolled section or fabricated from plate. 25 to 35 m are the most efficient spans. |
|  | **Portal frame with internal mezzanine floor**<br>Office accommodation is often provided within a portal frame structure using a partial width mezzanine floor.<br>The assessment of frame stability must include the effect of the mezzanine;. |
|  | **Crane portal frame with column brackets**<br>Where a travelling crane of relatively low capacity (up to say 20 tonnes) is required, brackets can be fixed to the columns to support the crane rails. Use of a tie member or rigid column bases may be necessary to reduce the eaves deflection.<br>The spread of the frame at crane rail level may be of critical importance to the functioning of the crane; requirements should be agreed with the client and with the crane manufacturer. |
|  | **Tied portal frame**<br>In a tied portal frame the horizontal movement of the eaves and the bending moments in the columns and rafters are reduced. A tie may be useful to limit spread in a crane-supporting structure. |

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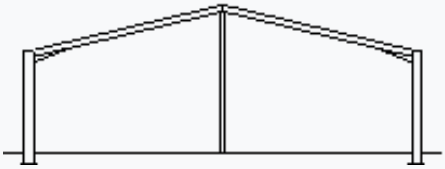
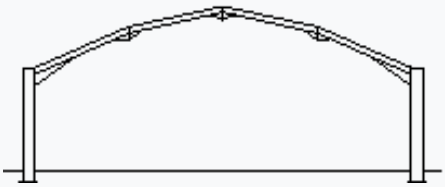
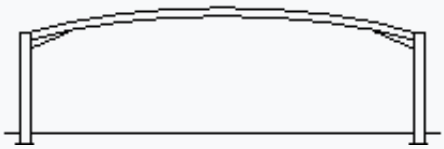
| | The high axial forces introduced in the frame when a tie is used necessitate the use of second-order software when analysing this form of frame. |
|  | **Mono-pitch portal frame**<br>A mono pitch portal frame is usually chosen for small spans or because of its proximity to other buildings. It is a simple variation of the pitched roof portal frame, and tends to be used for smaller buildings (up to 15 m span). |
|  | **Propped portal frame**<br>Where the span of a portal frame is large and there is no requirement to provide a clear span, a propped portal frame can be used to reduce the rafter size and also the horizontal shear at the foundations. |
|  | **Mansard portal frame**<br>A mansard portal frame may be used where a large clear height at mid-span is required but the eaves height of the building has to be minimised. |
|  | **Curved rafter portal frame**<br>Portal frames may be constructed using curved rafters, mainly for architectural reasons. Because of transport limitations rafters longer than 20 m may require splices, which should be carefully detailed for architectural reasons.<br>The curved member is modelled for analysis as a series of straight elements. Alternatively, the rafter can be fabricated as a series of straight elements. It will be necessary to provide purlin cleats of varying height to achieve the curved external profile. |

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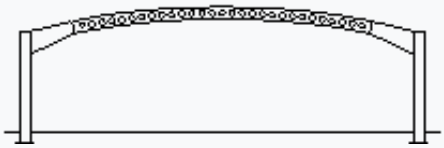
|  | **Cellular beam portal frame**<br>Rafters may be fabricated from beams for aesthetic reasons or when providing long spans. Where transport limitations impose requirement for splices, they should be carefully detailed, to preserve the architectural features. |