

Good and Poor Building Practices in the HRHIP

Good Building Practices



Intermediate support provided where spans are too great. This will help reduce deflection of floor joists and subsequently add rigidity to the flooring system. Runners are tied with ½ inch mild steel rods. This anchors the structure to the foundation. Solid bridging is used to support to the edge of the plywood floor covering. Lateral movement can be further resisted by embedding into the concrete ¼”x3”x9” steel plates on either side of the joist, which are then screwed into the joist. See picture below.



The runner is secured to the foundation by a steel plate fastened with nut and bolt. This method securely anchors this element to the foundation.



‘T’ strap used to connect the stud to top plate.



Hurricane clamps connects rafter to top plate. This assist in resisting uplift during high winds. ‘T’ straps used to connect studs to top plate.

Poor Building Practices



Load bearing elements should be placed over the centre of supports (not to the edge). Loading should not be off centre as shown, as only a limited section of the concrete column is being relied upon to carry the load. This practice could lead to failure of that section of the column where load is applied.



Breaking and cracking of the support column results when tensile column reinforcement is used to secure bearers to foundation. Instead, one of the following measures should be used to provide adequate fixing to receive bearers: 1) use mild steel rebars (mild steel is more pliable) or 2) cast mild steel 'U' clamps or steel plates into concrete column.



This picture shows an example of a poor concrete mix. Honey-combing is the result of 1) ungraded coarse aggregates, 2) insufficient fine aggregates, 3) the use of too much water in the mix and 4) possibly poorly constructed formwork, which allows the sand/cement paste to escape.

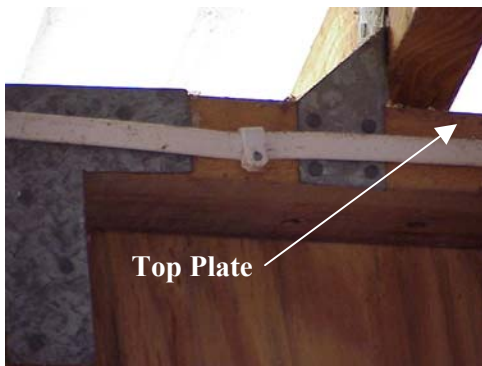


This structure is of composite timber and masonry construction. The lack of knowledge of reinforced concrete construction and the absence of professional input has jeopardized the structural integrity of the finished construction shown. The next picture shows deflection of the floor.



Concrete floor slab showing sign of deflection. The absence of guttering is causing serious damage to the exterior cladding. Guttering should be provided at eaves to limit the continuous saturation of the plywood cladding, which results in unsightly discoloration and eventual degradation of the material.

A gable roof is used here instead of a hip roof in an area where the degree of exposure to strong winds is high. Also the glass windows and doors are not protected against high winds. Hurricane shutters should have been installed. They are no longer fashionable but they are important.



This picture shows good practices but there are areas to be given attention here. Example the top plate should be doubled because it carries the weight of the entire roof. The gap left open at junction with the top plate and the underside of the roof covering is vulnerable during high winds; it should be closed to avoid winds from entering the structure. Finally, no seat cut is provided on the rafter at its intersection with the top plate.



Joists that cross large spans will deflect if they do not have the require depth to span the opening without intermediate supports. The floor will spring as a result.

In this picture it can be seen that intermediate support had to be installed as a corrective measure. A simple formula can be applied to determine the depth of the joist require to span an opening unsupported: depth of joist = $1/25$ of span + 2" [or + 50mm if calculated in metric]



Joist should not be notched at intersection with bearers (or sill plate) as shown. This practice reduces the property of the section in shear (which is greater at the supports) and reduces the effective depth of the section with regards to deflection. In general this practice reduces the load-bearing capacity of the member.

Notching of rafters is to be avoided at all costs.



Splices in floor joists and bearers must occur directly over a support. Failure to apply this practice will increase deflection in the respective member, resulting in a bouncing floor and possibly eventual failure if dead and live loads are increased on the floor. All joints especially in floors must occur directly over a support. If not they are likely to fail.