

# City of Arvada

## Residential Basement Structural Floors Requirements

**Residential Basement Structural Floors** – Wood, steel and concrete structural basement floors have been around for several years. We are now becoming aware of some problems related to them. Most relate to inadequate lateral support, inadequate under floor ventilation to maintain a dry crawl space and inadequate clearances to wood and steel structural members. While we often receive plans stamped by an engineer, his design and stamp usually address only the structural integrity of a specific type of floor system. It does not usually address lateral forces on the foundation or ventilation requirements. We have found that engineers have different opinions and approaches as to how to control moisture and how ventilation should be addressed. Some require a vapor barrier others do not.

As a result of these concerns, we will be asking that builders identify which of their homes will have a structural floor and of what type. Detailed construction plans will be required and a qualified state licensed engineer/s must stamp them. The engineer/s will be required to address the “complete design”. That includes: 1) - the structural floor framing, attachments to the wall and access. 2) – the lateral load design of the basement walls and any required blocking in the floor system that provides for lateral stability. 3) - the type of ground treatment used and showing drainage sump pit if required. 4) - a mechanical engineer will have to address the method of ventilation that will be used to cover the entire area of the under floor space. Ventilation requirements in the International Residential Code (soon to be adopted) are 1.0 cfm per 50 square feet of under floor space provided that the ground surface is covered with an approved vapor retarding material.

The floor system should also be designed to provide adequate clearance between wood and steel beams. The code requires 18” from wood and 12 “ from steel. These requirements should each be increased by 6” to allow for ground heave. The engineer should also take into consideration any plumbing under the floor. There have been instances of the ground heaving against the piping causing problems. The piping should be hung from the floor system rather than laid on the ground. When a sump pit is installed, it should be in a place where it is accessible and can be observed, even if a pump is not required or installed at the time of completion.

The ground should be graded, free of construction debris and covered with a vapor barrier, unless the engineer specifies otherwise.

The inspections of structural floors and the related issues should be done by the engineer/s of record and the city inspectors. City inspectors will do the complete inspection if detailed plans and understandable information are at the job site.