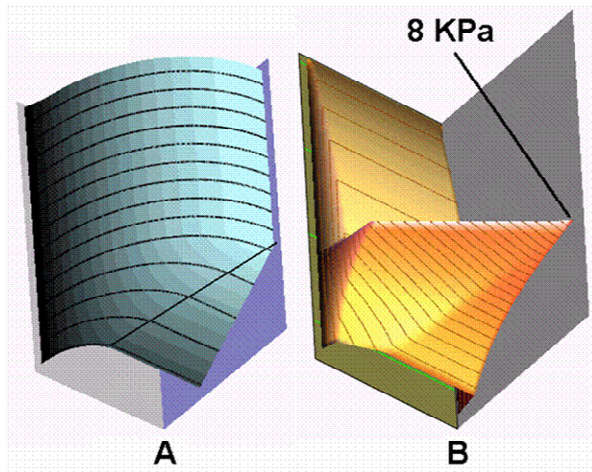
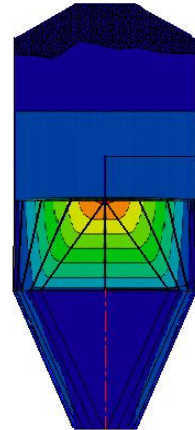

Modeling Solids Loads

Material Flow Solutions, Inc.



Modeling Solids Loads.

Simply stated, the solids wall load is the amount of pressure which the material in a bin or hopper exerts, at any given point, on the bin or hopper wall. Solids wall loads vary through the bin or hopper depending on material fill rate, aeration effects, and other variables.



At Material Flow Solutions, Inc., we use two-dimensional and three-dimensional finite difference, finite element (FEM) and discrete element (DEM) methods to compute *solids wall load* estimates for a variety of hopper and bin geometries. Calculations can include the effects of entrained air or fluid. These load estimates incorporate the effects of initial filling and predict flow loads. As a rule, we compute load profiles around internal inserts. Flow around inserts causes frictional forces on the insert which must be supported by some connections to the outer shell. It is critical to understand the magnitude and direction of these flow loads. Our load calculations can incorporate the effects of complex geometries which are not covered by simple theories or standards.

PRACTICAL APPLICATIONS of *modeling solids loads* include, but are not limited to:

- Retrofit to enhance flow
- New bin design
- Effects of gas pressure on loads