



Technical Article

# Finite Element Structural Analysis of Movable Crusher Supports

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Finite element analysis is applied to two different basic structural arrangements. One configuration utilises a plate shell structure to carry the loads similar to the construction used for the marine industry. The other configuration utilises a space frame made up of columns beams and bracing similar to the construction used for buildings. Both static and dynamic analysis are carried out for the two configurations.

## 1. Plate Shell Structure

### 1.1 Geometry

The basic shell structure used to support the crusher and associated equipment is a modified toroid. The modified toroid is a semimonocoque structure characterized by a stiffened plate skin that carries a major part of the loads. .

The crusher is supported at the centre of the ten foot deep toroid by a series of gusset plates which are welded to the inner ring of the toroid. The toroid is supported on three legs, the bottom approximately twelve feet above the ground. The toroid is fifteen sided on the exterior and approximately 48 ft in diameter. The interior of the toroid is a 21 ft diameter circle. The centres of the legs are on

a 58 ft diameter circle. .

The upper and lower decks of the toroid consist of floor plate and beams to carry the equipment loads and floor live loads to the toroid walls. The toroid walls act as deep beams to transfer the loads to three shear walls that run radially inside the toroid and continuously down into each support leg.