Problem Statement & Problem Solution

Problem Statement:

A building must be designed to resist all applied forces in accordance with the International Building Code (IBC). This includes gravity loads and lateral loads. The gravity loads are determined from the dead loads of the building and the live loads established in Table 1607.1 of IBC. The lateral forces take into account the effects of wind and seismic. These forces are also calculated in accordance with IBC with references to ASCE 7. Because of load combinations set forth in the IBC, the building does not have to resist both wind and seismic concurrently.

After a review of Technical Assignment #2 it was prevalent that several alternate floor systems were worth further investigation. The most viable alternative floor system is pre-cast hollow core planks. This was determined because it has the most advantages. It was concluded in Technical Assignment #3 that the seismic forces control the design of the system. This differs from the original design in which the wind forces were determined to control the design. Because of this, it was also determined that the existing lateral system is not appropriately designed to resist these higher seismic forces. Therefore an alternate lateral force resisting system will be designed.

Although the system of X-braced shear walls is fairly simple in the scheme of lateral resisting systems, the irregular shape of the building requires an analysis beyond the scope of my educational experiences thus far. The determination of the direct and torsional shear forces is more complex than in a rectangular or more regularly shaped building. Therefore, the design of an alternate lateral force resisting system will expand my experiences in structural engineering. Additionally,

introducing a new lateral system would not be appropriate with the existing gravity load resisting system. As a result, a redesign of the bearing walls system will also be done.

One of the most important things to consider when designing buildings is to make it as economical as possible. Because of this, it is very critical to investigate different systems.

Problem Solution:

The solution to this is to design an alternate system and compare it to the original design. The alternative system being considered in this proposal is a load bearing masonry system as well as masonry shear walls. Also, a new floor system of pre-cast hollow core planks will be studied. The alternate systems will then be compared to the original design to determine whether it is a considerable alternative.