Eric Alwine – Structural Option
George Read Hall – The University of Delaware
Dr. Boothby
Technical Assignment #2
October 31, 2005

Executive Summary:

This report is a comparison of alternate floor systems for George Read Hall. Four different systems were designed and compared to the existing Hambro floor system. The four systems were a one-way slab, a two-way flat plate slab, precast hollow-core planks, and non-composite steel joists.

The one-way slab system reduced the floor depth and is economical to construct because of the ability to reuse the formwork. The cons of this system are that it requires a redesign of other gravity load and lateral load members and increases the total weight of the building.

The two-way flat plate system is economical to construct because of the simplicity of the formwork. It also provides the shallowest floor depth. On the other hand, it greatly increases the total weight of the building, which could produce higher seismic loads and increase the footing sizes. Furthermore, it requires a minimum of 29" square columns.

A precast hollow-core plank system is simple to construct and can be done rather quickly. It can also be economical by decreasing labor time. This system also results in a shallower floor, but also brings significant additional weight to the building. The support for this system could be a variety of things, including masonry bearing walls, steel beams, and possibly metal stud bearing walls.

Non-composite joists with a 4" slab is easy to contruct and lightweight. The downfall of this system is that it requires much deeper joists than the existing composite system in order to be economical. Additionally, the spacing of the joists is half as much, resulting in the need for twice as many members.

Therefore, after analyzing and comparing these alternate systems, it was determined that three of the four systems should be considered with further investigation. The non-composite joist system does not warrant further investigation because it has no real advantages over the existing composite system. The other three systems warrant further investigation because they do have advantages over the original Hambro composite system and could provide more economical options.