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Senior Thesis Proposal

Executive Summary

The Koshland Integrated Natural Science Center is a four story science facility on the campus of Haverford College in Haverford, PA. This unique building is the new home to the departments of astronomy, biology, chemistry, computer science, mathematics, physics, and psychology at Haverford. The numerous state-of-the-art laboratories that consume the building are just one of the many innovative design features of this structure. The KINSC is also directly adjoined to two smaller existing science facilities, Sharpless and Hilles Halls. However, the KINSC acts independently as a structure from the two connected Halls due to several expansion joints found throughout the structure. The credit for this remarkable institution belongs to Ayers/Saint/Gross Architects and Planners, CUH2A Engineering, Skanska, and Earl Walls Laboratory Planners.

The focus of this proposal is to investigate an alternative structural system for the KINSC. Throughout this study, research will be done to compare the existing precast concrete structure to an alternative possibility of a steel framed structure. A composite floor system will be implemented as the alternate floor system to be compared to the existing precast hollow core plank flooring. In addition, the existing lateral force resisting system of precast concrete shear walls will be compared to a lateral system of steel braced frames. The software design program, RAM, will be utilized throughout this design process. A 3D model of the KINSC will be created in RAM and the proper gravity and lateral loads will be applied to the model. The program will aid in sizing the members to ensure that they will efficiently carry the loads. Several spot checks will be conducted to guarantee that the design output from RAM is accurate and useable. The resulting data from the new design will be calculated in order to be compared to the existing structural system.

In addition, breadth studies of CM issues, such as a cost estimate and construction schedule, and architecture of the structure will be conducted. These studies will also be compared to the existing conditions of the project. The comparisons of all the given categories will provide an answer as to which system is the more effective and more efficient system overall.