

Design Coordination

Scope / Contract Requirements

Coordination of MEP work is required by contract for the Mechanical/Plumbing, Electrical, and Fire Protection Contractors. The contracts call for the overlaying of respective shop drawings to identify areas of conflict and the resolution of those conflicts. The first step required is for a schedule of the order of coordination drawings listing the areas of main concern and the dates when the coordinated drawings will be submitted to the designers. The mechanical contractor, Pierce Associates, will take the lead in coordinating the drawings.

Intensity

Since the building is an art museum, the mechanical coordination does not appear at first glance to be an intensive one. The age of the building and the unique structure make the building rare by nature, the systems used in it have to function accordingly and therefore tend to be somewhat complex so they do not impact the nature or use of the building. The mechanical areas will require a fair amount of coordination due to the amount of equipment needed to supply a building with such immense size.

The use of an all air system increases the amount of space the mechanical system will take up. Duct work is one of the most space consuming systems in a building. The building's layout by wing causes the systems to have long runs of duct, pipe, and conduit in order to feed the various spaces in the building. On top of the layout, the system is split into two parts, one feeding up from the basement and the other feeding down from the fourth floor. Having two mechanical rooms means having to coordinate two separate mechanical rooms.

One of the details of the building that simplifies the coordination process is the lack of ceilings in the various spaces. There are very few spaces in the building that have a ceiling besides the structure of the floor above. The mechanical rooms and the basement spaces have exposed MEP work running openly. The electrical conduit is run in the floor slabs. Most of the duct that feeds the spaces is run in vertical chases that do not have horizontal runs on the floor but feed the space from the sides.

One of the unique areas that requires coordination is the cooling tower. The cooling tower requires a new steel structure to be erected on top of the roof. The cooling tower will require coordination between the steel and the mechanical lines that feed the cooling tower.

Deadlines

The shop drawings, after the plans have been coordinated, must be submitted to the respective engineers for approval of any changes that needed to be made. The schedule of submissions for the drawings was drawn up in advance based on the construction schedule of when those areas would be built.

Design Coordination continued

Problems, C/O's & Field Conflicts

The key problems associated with the MEP systems focus on the use of the former chimneys as the riser space for the mechanical chases. The chases are typically 1 ft by 1 ft when they are first opened up. The chases need to hold the ductwork, as well as some other plumbing and mechanical risers. In almost every case the chases need to be widened in order to fit the MEP work in place. Widening the chases creates a number of structural issues due to the age of the building and the fact it's structural masonry. There are questions about the structural stability of all of the extra holes and openings being made. Also, the reinforcement to support the structure is typically steel channel which expands and contracts differently from masonry and could lead to cracking and other structural issues.

The age of the building also means that there are not a good set of As-Built drawings to work from when the systems were designed. Many problems arise when opening the chimneys to see the existing size. Often the structural engineer has to come to site because a chases do not conform to the typical structural details for reinforcing shown in the drawings.

Once installation of the MEP rough in and equipment began, weekly coordination meetings started. The meetings look at the 4-week look ahead schedule to find areas the subcontractors will be working that may have conflicts. The conflicts are worked out in advance to minimize schedule impacts

One of the solutions for coordination in the West Basement, the main mechanical and electrical space, was the use of metal racks to support some of the MEP runs. The racks hold up the lowest layer of ductwork and piping. The system enables the contractors to have two tiers of MEP systems running down the corridor in the basement. The system also detracts from the amount of structural support needed from the arched masonry ceiling above.

One of the major changes that occurred with relation to MEP coordination was in the East Basement. Originally the MEP systems were to run exposed from the ceiling as in the West Basement. The space is going to be used for certain offices and the occupants did not want exposed systems running through the corridor (the ceiling height was low to start). The systems were changed so the mechanical and electrical systems run in the slab, requiring the excavation of trenches due to the amount of conduit and ductwork going down the corridor. The change required an extensive amount of coordination to locate where the crossover of systems was underground and also to work around the foundation as much as possible rather than coring through the footings.

Design Coordination continued

In the area where there is a ceiling (North West of the 3rd floor) there is a conflict of the mechanical equipment due to limited space above the ceiling, resulting in the lowering of the ceiling. In the Luce Center, one of the “Great Spaces,” there are display cases which require electric hook ups, the conduit needs to be run under the floor for appearances sake and the floor is existing slate and not easily fixed in case of a mistake or change.

In the courtyard the MEP systems have been re-coordinated several times because of multiple changes from the owner, there are extensive Mechanical and Electrical systems running above the ceiling in order to support the auditorium. The re-coordination effort is a strain on the personnel because they have already performed the work and are in the process of planning the construction only to have the whole area changed and they have to start again almost from scratch.