Surveying (Construction) Meeting Kit

INTRODUCTION

Construction is one of the largest industries in the world. Surveying plays an extremely important role in any construction project. Construction surveying can take many forms. It is used to establish the location and alignment of highways, bridges, buildings, pipes, and other man-made objects.

THE CONSTRUCTION SURVEY PROCESS – DEFINITION

There are a number of different processes involved in completing a successful building survey.

- Survey existing conditions of the work site.
- This includes looking at topography, existing infrastructure and buildings, and any underground infrastructure (such as diameters of sewers at nearby manholes).

CONSTRUCTION SURVEYING

When constructing highways, roads, bridges, buildings, and other construction projects, construction surveying is required to establish the major features of the land's surface that might affect the upcoming construction. The process aims to lay out calculated survey points on the construction ground as a guide for building site improvements derived from plans prepared by design professionals. The construction surveying can be of different types such as for:

- A single house or individual homeowner.
- Staking a network of streets utilities and roads for multi-unit commercial and residential subdivisions.
- Laying out large, complicated, multistory building sites.
- Establish the position and alignment of bridges, highways, pipes, buildings, and other man-made objects.

After project completion, an “as-built” survey is done to identify any modifications during construction. “As-built” surveys are performed to (1) determine the vertical and horizontal location of points as constructed on the site and (2) to determine how much work has been accomplished up to a given date.

SURVEYING ON A CONSTRUCTION SITE HAZARDS

Surveying is a relatively repetitive and low hazard task on its own. However, surveyors on construction sites face many different hazards while completing their work. It is important to evaluate the work environment and eliminate as many hazards as possible prior to beginning surveying activities onsite.

CONSTRUCTION SITE HAZARDS

There is a lot of activity going on at any construction site. Site wide operations cannot be shut down for surveying or any other single work tasks to be completed for the most part. Instead, hazards need to be considered and safeguards put into place to ensure the task can be completed safely. Some hazards to consider:

Struck-by or caught in between incidents. The major hazard for surveyors on a construction site is moving equipment.

Dropped objects. Personnel working below higher work areas are put a risk for dropped object related injuries.

Slips, trips, falls. Uneven ground and objects create a situation where a surveyor can be easily injured during their work.

Hand injuries. Surveyors who utilize stakes have the hazard of injuries of hands or fingers while hammering in stakes.

Eye injuries. Dust and flying debris create a major hazard for eye injuries when walking around a construction site.

THE NEED FOR CONSTRUCTION SURVEYING

Surveying plays a vital role in any construction project, be it big or small. It has the potential to directly influence a project's deadline, design features, budget, and resource allocation. Thus, there's no room for error. Modern technology is used for the computations required for accurate placement of alignments, map projections, coordinate systems, and geodetic principles. Today, GPS technology is being used to provide real-time alignment and positioning of construction equipment.

THE PROCESS

The process initially requires a topographic survey of the construction site. For large scale construction projects, photogrammetric methods are employed to develop the base map. This base map further helps professionals to develop a base plan for the project. Once the alignment has been established, the amount of earth that must be moved, added or removed is computed. **The key is to keep the earth hauling distances to a minimum.** This is achieved via 'mass diagrams'. Finally, **land surveyors** layout the slope and elevation of the various subgrades, top coat materials, and base. In the end, a smooth alignment with smooth transitions is achieved having adequate curved and straight sections. This allows space for safe public transportation.

BEST SURVEYING PRACTICES

- When possible, have equipment stop when it is required to survey close to moving equipment. Plan out work tasks so they do not interfere with one another. For example, survey when operators are on lunch or break.
- Always communicate in morning meetings or tailgate meetings about the plans for surveying that day when other work tasks are being completed in the area. Communication allows for planning as well as awareness between work groups of other people entering a work area. Make contact with operators when entering a work area.
- Never walk under suspended loads or put yourself in the line

of fire from higher work levels. Objects on higher work levels need to be secured and proper guardrail systems with toe boards need put into place to protect personnel below.
- To prevent slip, trip, fall injuries practice good housekeeping. Eliminate as many of these hazards as possible.

FINAL WORD

While the actual task of surveying is not very hazardous on its own, the tasks going on at a construction site create many hazards for surveyors. It is important to give proper attention to these types of work tasks to avoid injuries. Always preplan work tasks, evaluate the work environment for additional hazards, and stop work when needed to adjust plans to make the work task safer.