Site Selection Criteria For Tunneling

Sachin changotra
Dept of geology
ggmsc college jammu

Abstract- *A tunnel is a long, narrow, essentially linear excavated underground opening, the length of which greatly exceeds its width or height. (Walhstrom, 1973). In contrast, a cavern is an underground opening whoselength and width are roughly similar. These two types of excavations are end-members, and every underground excavation undertaken by mankind can be looked upon as a combination of the two. A shaft can simply be thought of as a tunnel which is vertical rather than horizontal.*

Keywords- Topography,Rock type,Degree of weathering

I. INTRODUCTION

Tunneling is one of the most hazardous projects in engineering and construction. It is also one of the most expensive. For this reason, extensive planning and surveying goes into the pre-excavation stage of the project. Many years often pass between the initial idea and the beginning of the excavation

II. CONCERNS

1. The overriding uncertainty when dealing with any underground project.
2. The geology of the area will determine the feasibility and the cost of the undertaking.
3. Engineering properties of rock may change, sometimes drastically,with a wide range of conditions, notably time, season, rate and direction of loading.
4. Groundwater is the most difficult parameter to predict and the most troublesome during construction.
5. Drilling core, the most common method of determining underground conditions, only recovers less than 0.0005% of the excavated volume of the tunnel on a typical project in the most exhaustive survey, which leaves a great deal of room for uncertainty.

III. SITE CHARACTERIZATION

Once the designers of the tunnel get down to the actual design phase, the first activity usually performed is a characterization of the site of the excavation. This involves characterizing the rock mass into which the tunnel is to be driven.

1. Topography of the area, the climate and the accessibility of the area.
2. Location of the cavity with respect to the ground surface and rock formation boundaries.
3. Structural stability of the rock body, which is a function of seismisity, faults, and stress concentrations.
4. Hydrologic regime and its perturbation, which is a function of the permeability of the ground and the ground water flow rates.
5. Potential for subsidence and other surface effects.
6. Rock types in the rock mass, their genesis and their homogeneity.
7. Degree of weathering and weatherability of the rock.
8. Geologic discontinuities and other defects.
9. Deformability characteristics under short- and long-term loading.
10. Strength characteristics in reference to a rational failure criterion.
11. In-situ stress and hydraulic and/or dynamic loads.
12. Geometric and mechanical properties of systematic and extensive discontinuities

IV. ROCK MASS DESCRIPTION

Intact rock: Intact rock contains neither joints nor hair cracks, and thus breaks across sound rock. Spalling conditions, which is when thin slabs of rock fall off the roof or walls of the tunnel, , and popping conditions, where rock slabs on the sides or roof of the tunnel spontaneously and violently detach, may occur for several hours or days after blasting.

Stratified rock: Stratified rock consists of individual strata with little or no resistance against separation along strata boundaries. Spalling conditions are quite common.

Moderately jointed rock: Moderately jointed rock contains joints and hair cracks, but blocks between the joints are locally grown together or so intimately interlocked that vertical walls do not require lateral support. Again, spalling and popping conditions may be encountered.

Blocky and seamy rock: This consists of chemically intact or nearly intact rock fragments which are entirely separated from each other and imperfectly interlocked. The vertical walls of the tunnel may require support.

Crushed rock: Crushed rock is chemically intact, but extensively fractured. If the crushed rock is small-grained and below the water table, it will exhibit the properties of a water-bearing sand.

Squeezing rock: Squeezing rock slowly advances into the tunnel without a perceptible volume increase. This condition requires a very high percentage of microscopic and submicroscopicmicaceous minerals or clay minerals with a low swelling capacity.

Swelling rock: Swelling rock advances into the tunnel primarily by the expansion of the rock itself.

Special thanks to Dr Alpana Vohra my teacher and mentor