

CHAPTER ONE

1.0 INTRODUCTION

1.1 Geotechnical Engineering and Pipelines

Geotechnical engineering considers the behaviour of soil and rock, and the interaction of those materials with structures. Geotechnical engineering is typically concerned with questions of bearing capacity for building foundations, slope stability assessments, roadway subgrade and subbase design, design and assessment of embankments and dams, and similar problems. Input to pipelines is a much smaller area of practice for geotechnical engineering.

Historically, input to pipeline projects was limited to the technical feasibility of horizontal directional drill installations or addressing slope stability concerns. Much less often was the geotechnical engineer asked to provide input to pipeline stress analysis. Whereas the typical geotechnical undergraduate program includes building foundation design, embankment design and slope stability analysis, there are no such courses on soil-pipeline interaction. Thus, it should not surprise the pipe stress analyst that there is uncertainty, and inevitably conservatism, often over-conservatism, when a geotechnical engineer provides input to a pipe stress analysis. Stress analysts, not being familiar with the principles of soil mechanics, may also apply conservatism in their analyses, or what they think is conservatism!

The purpose of this text is to bridge the gap in knowledge between pipe stress analysts and pipeline designers, and geotechnical engineering, and improve geotechnical inputs used by the design team. It will also help pipe stress analysts and pipeline designers understand the technical concepts and terms used by geotechnical engineers.