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The Value of Interpersonal Skills in Geotechnical Projects: a Millennial's Four Year Experience

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ABSTRACT

As young professionals gaining experience we are faced with greater levels of responsibility. Client interactions, field investigations, preparation of formal documents and drawings, project management and construction supervision are all tasks that come with a myriad of challenges. Add in the complexity of geological materials and it becomes clear why many geotechnical leaders say that the learning curve in geotechnical engineering is steep. The geotechnical engineering world is generally fast paced and opportunities to reflect are fairly rare. When opportunities do present themselves, the focus is often on sharing technical lessons learnt and advancements. This paper is written from a different perspective. It discusses three projects on which the author learnt the value of maintaining a focus on interpersonal skills. From these experiences the author was led to ask: with the first crop of Millennials transitioning into professionals, how could the geotechnical field change with the latest generation? This paper suggests that with the unprecedented level of connectivity in today's world, the current crop of young professionals should put a heightened focus on interpersonal skills like communication, empathy and self-awareness. These skills each help us better understand our clients and can help our clients better understand what geotechnical professionals do. It will also go a long way in helping the young professionals of tomorrow get a stronger foothold on the geotechnical learning curve.

Keywords: Young Professional, Millennial, Geotechnical Experience, Communication, Self-awareness, Empathy.

1 INTRODUCTION

Learning from experience is a cornerstone of personal development in geotechnical engineering. Burland *et al.* (2013) describe how Karl von Terzaghi's fundamental theories of soil mechanics initially developed from learning about the geological conditions at sites where failures had occurred. This principle formed the foundation of his work whereby he kept his theories grounded in experience and observation. Numerous developments have occurred since then but many widely used theories and applications are still based at least partially on empirical evidence. This paper summarises some of the author's key lessons which have been accumulated as a developing young geotechnical engineer in New Zealand since late 2010.

Geotechnical engineering is often described as being part science and part art. Covering a wide range of subject matter, the learning curve for young professionals is steep. A lot of a young geotechnical professional's effort is focussed on avoiding mistakes and there is a heavy reliance on the support from senior practitioners especially as geological challenges vary from project to project. While the author's experience has been no different (with a broad range of technical skills being developed) upon reflection many of the key lessons learnt have been in relation to interpersonal skills like communication, self awareness and empathy. These skills relate to an individual's ability to work successfully with other people and have been applicable across projects.

The author falls into a generation referred to as the "Millennials": a term coined by Howe and Stauss (2009) for people reaching adulthood post 2000. This paper has been prepared to ask: if the latest generation of geotechnical engineers were to place a heightened importance on interpersonal skills, what effect would it have on the geotechnical workplace of tomorrow?

2 BACKGROUND

2.1 Today's Young Professionals – Millennials

Generational researchers study groups of people whose birth dates fall into a particular range of years that cover defining events and related societal changes. Studies often focus on defining 'generation gaps' which are intergenerational differences in mindset and opinion. Howe and Strauss (2009) summarise approximate bounds of birth years for different generations based on the demographic research they carried out. The generations are summarised in Table 1 below.

Table 1. Generational bounds in chronological order (as defined in Howe and Strauss, 2009)

Generation Name	Range of Birth Years	Description
The GI Generation	1901 to 1924	The generation born over the period spanning World War I (WWI)
The Silent Generation	1925 to 1942	A comparatively small generation who were born amongst the great depression and World War II (WWII)
Baby Boomers	1943 to 1960	Widely known term for those born during the post WWII baby boom which lasted approximately 20 years
Generation X	1961 to 1981	Generation defined as those being born after the baby boom
Millennials	1982 to present	Defined by researchers William Strauss and Neil Howe and often described as the offspring of the baby boomer generation

Millennials have a grown up in a period of rapid technological development and are often defined by their unprecedented level of connectivity (with the development of the internet and social media). Millennials are also the young geotechnical professionals of today. Engenerate, the Institution of Professional Engineers New Zealand's young professionals programme is targeted towards graduate engineers under the age of 35. At present that would mean the eldest Engenerate member was born in 1981 (corresponding with Howe and Strauss's generational bounds). Any "generation gaps" are likely to develop over the next few years as the profession's demographic changes and the proportion of professional Millennials increases.

2.2 Interpersonal Skills

2.2.1 Communication Skills

Ashkenas (2011) suggests that organisational inefficiencies associated with poor communication are widespread (particularly for those larger in size). In geotechnical engineering, inadequate communications are often the principal source of problems in both design and construction. With there now being numerous platforms to communicate on than was traditionally the case, effective communication is becoming an ever important skill for workers in any sector. For better or for worse, communication is now expected to be frequent, rapid and not limited to traditional working hours. Hewlett (2014) describes effective communication as one of three fundamental leadership traits. No matter how technically sophisticated an individual is, if they are unable to communicate that to anyone else they are working with then this ability can become redundant. Effective communication does not just allow knowledge to filter through an organisation but it can improve an individual's performance through understanding. Ashkenas details three key development areas for individuals to better communicate through any mode: (1) Providing a clear context (2) Making allowances for a dialogue to occur and (3) Connecting and understanding your audience.

2.2.2 Empathy or "Emotional Intelligence

"People are your greatest asset". Butler and Chinowsky (2006) quote this commonly used phrase in the services industry which is particularly true for engineering consultancies. The understanding of a person's suitability for a position has broadened over time to include a wider range of attributes (beyond the intelligence quotient – IQ). This includes what has been termed emotional intelligence (EI or EQ). The core idea is an individual's ability to empathise. The Oxford dictionary defines empathy as

the ability to understand and share the feelings of another (i.e. an emotional intelligence). Wilson (2015) and Wilcox (2015) describe their research which indicates that empathy is becoming and increasingly valuable attribute for career success.

"Empathy enables those who possess it to see the world through others' eyes and understand their unique perspectives"

2.2.3 Self-Awareness

Self-awareness is the understanding of one's own motivations and behaviours and it is strongly linked the ability to empathise (Wilcox, 2015). This idea is linked to two competing parts of the brain – the neocortex (a part of the brain linked to the IQ and memory) and the amygdala (part of the brain associated with emotions which has a faster response time). Wilcox describes how an individual's level of self-awareness determines the ability for emotions (and the amygdala) to override ones logical ability (the neocortex). In a video interview co-produced by the New Zealand Herald and the Auckland University Business School, leadership expert Dr Lester Levy discusses a regular ritual of self-checking by which people can keep themselves self-aware in the face of challenging situations.

3 KEY EXPERIENCES AND INTERPERSONAL LESSONS LEARNT AS A YOUNG PROFESSIONAL

3.1 General

Uncertainty, risk and variability are all characteristic of the geotechnical projects. The author has learnt many geotechnical lessons on successful projects but the valuable ones have often come when things have not gone to plan. The most widely applicable have been those related to understanding and working with other people (one of the few constants between geotechnical projects). The following sections summarise the main geotechnical projects on which the author learnt the value of effective communication, empathy and self-awareness.

3.2 Lesson 1: Learn to communicate in ways that others understand

It would be short sighted to say geotechnical engineering can be completely explained to people with any level of experience. However, to a degree, complex concepts can be made accessible to people of varying levels of expertise. The liquefaction studies carried out in the aftermath of the Canterbury earthquakes are an example of how a deliberate effort to communicate a complex subject in as simple terms as possible can (a) engage a wider audience and (b) lead to technical advancement.

The author has had extensive exposure to liquefaction research including the involvement in the Canterbury liquefaction vulnerability study for New Zealand's Earthquake Commission and the subsequent ground improvement trials. While some amazing technical insights have been gained from the case studies assessed in Canterbury, what was equally impressive was the widespread uptake of liquefaction theory and the interest that generated amongst the geotechnical community in New Zealand. In the not so recent past, programmes for geotechnical conferences in New Zealand were inundated with papers related in some way to seismic ground response or liquefaction.

The author's experience in this domain developed over approximately three years (including two as a student) and it reached the point where the author could participate at conferences with leading academics from around the globe. It was realised very early on that developments during the recovery would need to reach a wide audience (ranging from residential property owners with no experience to global geotechnical experts). A lot of academic effort went into effectively communicating research findings for widespread understanding. This was large reason why the author had the ability to rapidly develop a comprehensive understanding of liquefaction in Canterbury. Figure 1 below is an example of figures from the Earthquake Commission's residential ground improvement report where complex ground improvement methods were communicated to the reader in a readily consumable way.

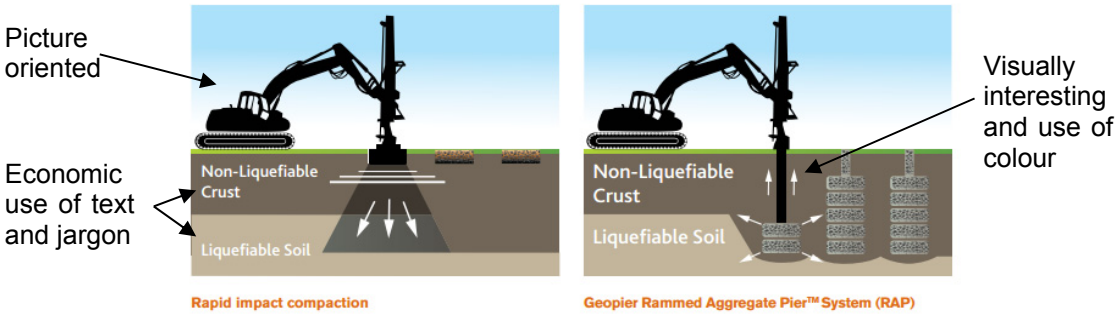


Figure 1. Figures used in the Earthquake Commissions ground improvement trials report which simplify ground improvement techniques for consumption by audiences of various experience levels (reproduced from Earthquake Commission, 2015).

3.3 Lesson 2: Empathise with those that surround you

In June 2015 the Whanganui region was hit with severe weather causing widespread flooding and landslips (Figure 2). The author travelled down in the immediate aftermath to assist with assessing the damage and reporting back to the Earthquake Commission. Seven out of the eight properties visited on that project were 'red-stickered' by the Whanganui District Council to signal that the dwellings on the site were unsafe to enter because of structural damage and the high risk of additional land movement. Upon arriving at each property you would hear a new story of people being forced from their homes and being left with the uncertainty of whether they would be able to return to their homes as they knew them. By visiting each property and listening to each story first-hand you could get a small sense of the fear, loss and helplessness that people were experiencing. It is in these situations that empathy is so important because it is what motivates geotechnical engineers (or other professionals) to use their expertise to help people in need and contribute to the greater good of society. In the case of the Whanganui flooding recovery, the reconnaissance team went above and beyond the call of duty for the residents, by working late into the night to maximise the number of visits undertaken.

(a) *(b)*

Figure 2. Photographs of the damage observed during the reconnaissance in early July 2015. (a) Debris which had inundated dwelling and accessway; and (b) landslip headscarp observed within a few metres of a dwelling.

In events like the one experienced in Whanganui, emotions can run so high that anyone would be able to empathise with the people in need. What is often neglected though is that there is no limit to our capability to better understand the people that we interact with. Whether it is assisting a colleague who is learning a difficult geotechnical lesson on a challenging project; a structural engineer needing geotechnical input to complete a design in a tight time frame; or even the client who is chasing you for a deliverable the week before you planned to have it finished; we can always exercise more empathy as people and as geotechnical engineers. Furthermore, putting empathy into action makes our work better-fulfil a specific need and makes us easier to work with.

3.4 Lesson 3: Be actively self-aware

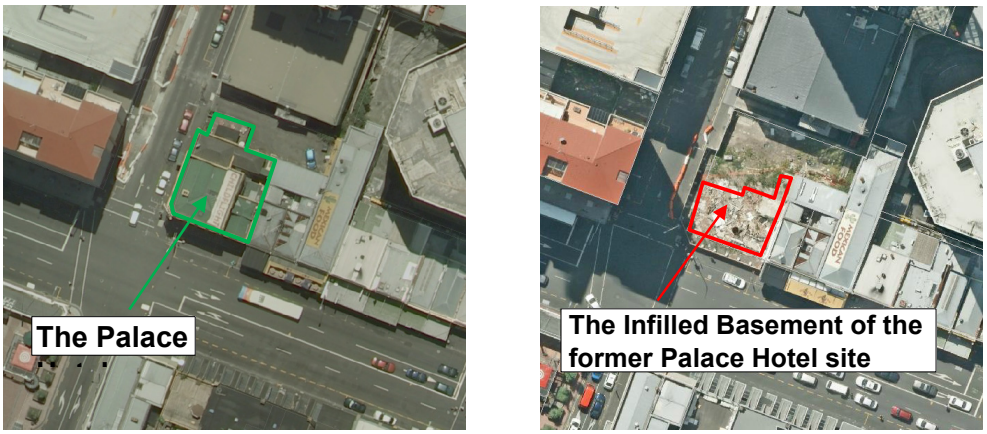
The author discovered the value of being self-aware while volunteering in the 2014 New Zealand General Election. The mandatory initial training session was taken by the manager of polling for the

electorate. This person was responsible for coordinating an extremely diverse workforce. What was immediately evident was the manager's ability to convey a common message to such a diverse group and the patience with which she explained things to those who did not understand. During question time at the conclusion of training one colleague asked: "How hard is it to bring together people with such different backgrounds to carry out a common task?" Her reply was incredibly insightful.

"In my experience, not many people come to work with the intention of doing a bad job"

It was clear that this mantra was the reason why she deeply understood how her behaviour could influence others. This epiphany caused the author to take a step back to assess how daily interactions with people in the geotechnical field were taking place. This was initially a very unnatural 'self-check and self-correction' process.

The process of maintaining self-awareness was particularly challenging on a residential apartment project at the site formerly occupied by Auckland's historic Palace Hotel. Whilst under renovation in November 2010 the structure began showing distress. In the end, the structure needed to be demolished to protect the public and the neighbouring buildings. Figure 3 shows the site's state before and after the demolition (note: much of the debris was loosely placed into the basement void to prevent further short-term damage to the neighbouring road reserve and buried services).



(a) 2008 *(b) 2010*

Figure 3. View of the 75 Victoria Street West site before (2008) and after (2010) the emergency demolition (aerial imagery sourced from the Auckland Council GIS viewer)

The site was acquired by residential property developers who proposed 24 storey apartment tower be constructed on the site. The author was involved delivering the geotechnical aspects of the project from investigation through design and construction. The challenges at the site included:

- The presence of highly variable demolition rubble across the southern half of the site;
- Potentially explosive acetylene welding tanks left within the basement prior to demolition;
- A sensitive cast iron water main in the Victoria Street West road reserve;
- Remnant foundation piles buried under the access way on the northern half of the site;
- A tight site geometrically which affected construction.

The fact that these challenges each came amongst the usual financial and time pressures of geotechnical projects meant maintaining an awareness of my own biases and drivers proved difficult at times. However, over the project the author learnt to take challenges as they came and developed an improved awareness of when short-term emotional responses (typically associated with stress) threatened to override a reasoned response. For a time this process required deliberate self-discipline but it eventually became reflexive. It also became easier to connect other people's needs and drivers (i.e. by better understanding how we react to challenging situations, it frees us up to better understand others). Making an effort to be actively self-aware in the face of geotechnical problems resulted in noticeably improved collaboration with the wider team of engineers and contractors and allowed the project to keep progressing. With the help of senior geotechnical staff, the author was able to play a part in completing the ground works earlier this year despite the many challenges faced.

4 PERSPECTIVES ON THE FUTURE FROM A MILLENNIAL

Whether societal changes are 'pre-programmed' based on the time in which people grow up or if a generation can make a concerted effort and create a change, what is the next genuine generation gap going to be? Modern day technology has made it possible to communicate in an abundance of ways and made Millennials the most connected generation there has been. The key finding from the author's experiences is that there is untapped value to be gained by prioritising the development of interpersonal skills in the geotechnical engineering field. With the increased level of social connection in the world, Millenials can be the generation which puts a greater emphasis on developing interpersonal skills like effective communication, empathy, self-awareness.

In geotechnical engineering, these skills are independent of the typical project variability and can help:

- Foster an inclusive learning culture;
- Project work better suit a given need;
- Make us easier to work with;
- Avoid instinctive emotional responses when faced with challenges, and;
- Develop collaborative and inclusive multidisciplinary project teams;

While these skills are regularly exemplified by established practitioners, in some cases they can be taken advantage of or discouraged in the heat of the competitive business world. In the field of geotechnical engineering where uncertainties and risks are so common these skills take on even greater importance. Interpersonal skills balance the enjoyment of facing geotechnical challenges with the need to be great people to work with.

5 CONCLUSIONS

If people truly are the greatest asset in the geotechnical industry, putting greater importance on interpersonal skills has the potential add substantial value. The philosophy of continually learning from experience (the basis for modern geotechnical practice) is paralleled in this paper whereby the author has learnt about the knowledge to be gained from our social experiences. Through an analysis of three of the author's geotechnical projects, this paper details the benefits of: focussing on effective communication; empathising with people around you and maintaining self-awareness. The key conclusion of this paper is that the current crop of young professionals – Millennials – can be the generation that puts a greater emphasis on interpersonal skills as they balance the demands associated with modern communications technology.

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