## 

## Self-review against competencies

*Competencies are indicators of attainment. You are expected to meet these holistically. They are not all individually mandatory except where indicated. You should address the competencies below but you may refer to relevant sections of your report as evidence of meeting the competencies. You are encouraged to apply reflective practices. This involves reviewing your experiences to identify what you now know, and where you may need to improve in the future. Identify what you have achieved or observed, and areas for personal growth. You are encouraged to write about your thoughts and feelings, and may use terms like 'I think...' or 'I feel...’ This part of the report is not evaluated on whether you are right or wrong, but on your ability to identify what you learned. You might like to approach this with the following facets, though this is entirely optional:*

*[Description of the context]*

*[Identification of what I now know]*

*[Possible implications for myself]*

### 1 Ethics

Typical self-review questions that might be addressed in this section are:

-Identify the processes used by the industry to minimise the likelihood of staff making ethical misjudgements.

-Identify the types of ethical breaches that occur in this industry, if any.

Example: *[Description of the context]* *In this industry the manufacture of concrete pipes did not on the surface appear to involve many ethical considerations. Ethics was not talked about explicitly in the organization, nor part of the initial briefing. [Identification of what I now know] However after being involved in the process of pouring concrete and watching the experts at their work, I realized that quality considerations were a part of ethics. This is because there were many opportunities for workers to take short-cuts, e.g. adding excessive water to the mix to make pouring easier (which decreases strength), being lazy about vibrating the concrete (a difficult and tedious job but essential for complete filling), or treating the moulds roughly (which decrease product quality and increased maintenance). The customer who buys the concrete pipes cannot easily tell if there are internal defects, but takes it on trust that the manufacturer has made the product to the standard advertised. I thought this was a type of applied ethics. The quality systems helped prevent these shortcuts. [Possible implications for myself] If I was to stay in this industry I would want to learn more about the quality systems. I would also want to better understand the national standard AS/NZS 4058:2007.*

### 2 Health and safety

**(mandatory in both reports)**

Typical self-review questions that might be addressed in this section are:

-Demonstrate an understanding of the hazards at the place of employment. This will include a summary of the main hazards for a workplace and identification of the ways that the employer minimises harm.

-The safety induction and any specific training on structures/substances/machines are expected to provide this knowledge.

-Review good practices and possible areas for improvement.

-Conduct a risk assessment for an existing or proposed process, plant, structure, or substance used by the employer. This may be done individually or as part of team.

*(Any health and safety issues that you wish to bring to the attention of the College must be mentioned in Part B, 2. Issues.)*

Example: *[Description of the context]* *H&S in my situation, where I was contributing to the design of software to control the water supply plant, took several forms. [Identification of what I now know] I observed that the firm did several things to preserve my personal safety. These included giving me a briefing and PPE before we visited the plant, and I was accompanied at that time. Later, when working at the plant itself, they had other systems to protect me. These were signing in and out (so they knew where I was), and always having a buddy (not working alone at the plant). So I noticed there were a number of systems and procedures that were protecting me. Another form of safety was the need to consider how our code could cause failure of the plant or even contamination of the water supply, with potentially catastrophic outcomes for the many homes and businesses using the water. I learned the importance of debugging the code and taking a wide view on the combinations of failure scenarios, however remote they appeared. I conducted a risk assessment on the chlorine dosing code, see appendix to main report. [Possible implications for myself] I wondered whether there were conflicts between the agile method, and safety-critical software. I did not get a satisfactory answer to this. Possible areas for personal growth if I were to stay in this area would be to better understand error trapping routines and how to design software to fail in a safe way.*

### 3 Application of engineering

**(mandatory in both reports)**

Typical self-review questions that might be addressed in this section are:

-Explain the practical or operational processes whereby engineering is implemented (there is no necessity to undertake physical work) OR

-Describe practical engineering tasks that you have conducted in industry under the supervision of an engineering tradesperson, technician, technologist or engineer OR

-Identify where the key attributes of quality arise in practise, and what the industry does to manage quality.

-Apply engineering knowledge and skills to contribute to designing a solution for an engineering problem. This may involve investigating a problem, analysing data, use of design tools, simulation, modelling, etc. Contribution to a group project is acceptable. Refer to technical documentation included in the technical work report.

Example: *[Description of the context]* *One of my jobs involved helping the technicians install roof-top HVAC systems in buildings. [Identification of what I now know] Although this was not the main part of hours, and I did not really enjoy this work, I did learn a lot of practical skills about working at heights, cranes & lifting. I also learned about the commissioning processes, and the need to test each of the subsystems, electrical, fluid, instrumentation, and control. That was something I had not considered before. I would like to learn more about commissioning, and perhaps systems engineering more generally. Most of my hours were spent at the other job, where I was analyzing water consumption data using a spreadsheet. [Possible implications for myself] This was quite repetitive and I would like to learn how to automate some of the analyses, perhaps using VBA. Also, someone in the office presented some interesting statistical analysis using what they called the ANOVA method, and I would like to learn more about this as it seems a useful analysis tool for large data sets.*

### 4 Natural environment

Typical self-review questions that might be addressed in this section are:

Explain how adverse effects on the natural environment are (or may be) avoided, or conduct an environmental impact assessment or life cycle analysis. This may be done individually or as meaningful participation in a group project.

*Example: [Description of the context] Although it was not a large part of my work, the time I spent in the maintenance workshop changing engine oil on earth-moving equipment was interesting from the perspective of the oil and its disposal. Generally the firm was pretty good about collecting the oil and disposing of it responsibly. An external contractor came in and collected it once a month. However there was a quite a lot cleaning consumables involved, such as cleaning cloths and used oil filters that were disposed of as industrial waste. This seemed to be an environmental cost that was not actively considered. There was also oil splashed on the workshop floor and while no one seemed to mind, I did wonder what the long-term environmental and health implications of that might be. [Identification of what I now know] I learned that engine oil is an environmental hazard and also a health hazard. As such it needs to be disposed of carefully. I wondered what possibility there was for it to be recycled or possibly burned for energy, rather than going to landfill. [Possible implications for myself] When exploring the internet on this, I found there is a topic called life cycle analysis. It is a whole field of engineering in itself. It might be something for me to look into.*

### 5 Bicultural/multicultural

Typical self-review questions that might be addressed in this section are:

Understand and comment on the implications of the Treaty of Waitangi or multicultural aspects for the engineering practice area. This may be in general terms or by evaluating a specific project.

*Example: [Description of the context] The planned roadway went through some low-lying ground, which was tidal. [Identification of what I now know] The ground looked unused and not particularly valuable. The senior engineers involved me in the public consultations, and I was surprised to find that some people in the community were passionate about the ground that seemed the most worthless. The Maori people said that it was a place where food, in the form of eels, was sometimes gathered. The eventual outcome was that the road was diverted by cutting into the bank instead, and tight conditions were placed on the contractors to avoid pollution and silting of the creek. [Possible implications for myself] Being able to anticipate what types of matters are likely to be issues for a community would be useful skill if I were to work in this type of roading area.*

*Example: [Description of the context] The manufacturing plant employed people from many ethnic backgrounds. There were no specific bicultural or Treaty issues. [Identification of what I now know] I learned that when interacting with people from other cultures, it is important to talk clearly and keep instructions simple. Otherwise people may misunderstand, and that could lead to mistakes. I also found that common English sayings were not always understood. [Possible implications for myself] I expect that spending time with people on a joint project might be a good way to learn how others think, and be better understood myself.*