eChartered

ENGINEERING COMPETENCY CLAIMS

EXAMPLE B

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ENGINEERS
AUSTRALIA

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About this example

This report is part of a set of example reports that is being developed to provide examples of Engineering Competency Claims and the Engineering Experience Record (EER). These Examples are for use by participants on the eChartered system to guide them.

Before reviewing the example reports applicants should refer to the appropriate *2012 Australian Engineering Competency Standards Stage 2- Professional Engineer or Engineering Technologist or Engineering Associate* available in the Resources section of the eChartered website.

Participants should also refer to Section 5 of the Online Participant Guide, Submission, paying particular attention to Section 5.3. *Writing Engineering Competency Claims (ECCs).* The *Thought Starters for Preparing Engineering Competency Claims in eChartered* available in the Examples section also provides guidance and is recommended reading along with the example reports.

This participant on eChartered had most of their competencies already endorsed on the ePDP system using the 2004 Competency Standards (CER method). Therefore, there are only three Engineering Competency Claims in this report.

The following reports were submitted by an electrical engineer who successfully achieved Chartered Membership following their Professional Interview, as well as registration on the National Professional Engineers Register (NPER), and the Stage 2 Assessment for the application to become a Registered Professional Engineer of Queensland (RPEQ).

The author was prepared to meet the requirements of the *Australian Engineering Competency Standards Stage 2.* Each of their claims and their Engineering Experience Record were verified by a responsible senior engineer.

Identifying information has been removed to protect the confidentiality of the author, their employers, their Verifiers, and the projects covered. All Verfication has been removed for the purpose of maintaining confidentiality.

As the new eChartered process develops, Engineers Australia will be able to build a repository of examples. This example is from one of the first Members to use the eChartered system and successfully complete their Professional Interview.

Engineers Australia expresses its sincere thanks to the engineer who provided these reports to be used to assist others seeking Chartered Membership and/or registration.

Claim 1. Deal with Ethical Issues

As an electrical engineer in a major consultancy in Adelaide, I am responsible for electrical design works encompassing pre-feasibility studies through to construction support. This responsibility includes project support at the back end, namely responding to request for information (RFI) documents and technical evaluation of tender documentation. The timing of the response to these documents is often essential, as any delay could potentially hold up the procurement or construction process.

While I was working on a major water project, a tender evaluation request was presented to me for approval, prior to the procurement of an electrically actuated isolation valve. The project that I was working on at that time had a very tight turnaround period for the documentation in order to meet construction deadlines. When I evaluated the actuator datasheet, I found that the equipment offered did not meet the client's requirements as it was not fitted with external position switches which were required to properly monitor the fully opened and closed positions of the valve. However, when I raised the non-compliance with the contractor, I was told that the procurement of the actuated valve was part of critical path project activities, and that it was imperative that the datasheet was approved.

I immediately brought up the issue with the design manager, as I knew that there were potential safety issues if the equipment did not perform as expected. I consulted the Code of Ethics, and decided that I not should approve the datasheet for order, as the safety and wellbeing of maintenance personnel would be affected in the event where the actuated valve did not fully isolate the pipeline. I then organised a meeting with the relevant project stakeholders, during which I explained the need for valve proximity switches and highlighted the risks associated with the failure of an isolation valve. As a result, the contractor was instructed to re-tender for an electrically actuated isolated valve that fitted with the project requirements.

Later in the project, I received a RFI (with a short turnaround period) from an equipment supplier requesting additional information to aid them in the tender process. I realised that I could not provide the information requested without prior approval, as all tenderers were expected to submit their tender based on the same level of documentation. I knew that any additional information would provide one supplier with an advantage over the others, and would challenge the transparency and integrity of the tender process. I discussed the issue with the design manager and lead engineers, and came to an agreement that I was to provide all the tenderers with the information requested. By providing the same information to all parties, none of the tenderers would be disadvantaged. As the internal discussions occurred over a few days, during that time the RFI turnaround period had expired and I was receiving numerous phone calls from the supplier requesting the information. I made sure that I clearly updated them with the status of the resolution for the probity issue at hand, while being firm about the fact that I was not releasing the information to them until a decision was made.

After sending through the requested information, I followed up with a phone call to the supplier, explaining the decision and the rationale behind it. I then discussed the issue with senior electrical engineers within my department, in order to obtain their opinions on the matter and how it could be better handled in the future. From the discussion, I concluded that I had handled the issue correctly and in accordance with the Code of Ethics.

Claim 10. Taking action

I was the electrical design lead for a package of works on a major water project undertaken in Adelaide. Before I assumed the role, I was responsible for compiling a budget estimate for electrical resourcing on the project. To prepare the proposal, I produced a deliverables list containing all the documentation required for the design. I then held discussions with my team manager regarding resource availability and associated charge-out rates, before allocating hours to the resources based on the deliverables. Once I had completed the proposal, I sent it to the client for review. I followed this up with a client meeting to discuss the proposed deliverables and resources. As I had a good understanding of the project based on previous work that I had done with the client and deadlines that needed to be met for the design, the proposal was accepted, with the agreement that the electrical design would be completed external to the client's project office.

As part of my role, I was responsible for coordinating the power, controls and communications requirements for the site. There were complications in this respect as there were different contractors who were responsible for the different disciplines. I arranged for a meeting with the relevant project stakeholders to discuss the site requirements, during which I ensured that all important points were minuted. After the meeting, I sent out official meeting minutes to the project stakeholders to confirm their acceptance. I also made sure that any electrical design changes were immediately communicated to the relevant stakeholders through the official channels.

I provided technical guidance to a graduate engineer who was working under me throughout the development of the design. To do this, I organised short, informal meetings with him daily, during which we discussed issues that he was facing at that time and issues that could possibly arise during future design activities. During the meeting, I mapped out the tasks that he needed to complete to avoid any delays to the proposed deliverables. I also ensured that I reviewed his design documentation, and discussed with him potential changes and improvements that could be made to the design.

One of the electrical deliverables was a site plan showing the proposed electrical alignment for conduit and cable runs. A site visit was required to be undertaken in order to finalise the plan. I realised that visiting the site unsupervised could result in complaints from local residents, as this had happened previously on the project. I spoke to the stakeholder management team and explained the exact time and reason for the site visit. This provided the stakeholder team with sufficient information to field any queries from the local residents.

Midway through the project, I was informed by the design package lead that a few electrical deliverables were required ahead of schedule in order for the project to be properly costed. This in turn resulted in the need to meet a very tight deadline. I knew, however, that any design that had to be transmitted to the client needed to be reviewed by a more experienced engineer for quality management purposes. I therefore negotiated for a minor extension to the deadline with the design package lead to allow this to occur.

Throughout the design process, I made sure that all review comments made by internal reviewers and stakeholders were appropriately addressed and closed out. I assigned an electrical resource with the task of scanning of the comments and associated action taken for close-out into the project directory. I then uploaded the scanned comments into the client's document management system in line with the project's quality management plan.

In order to keep track of the project budget, at the end of each week I requested the number of hours billed to the project by the electrical resources. Using this data, I populated an internal spreadsheet containing the original number of hours allocated to each resource and compared it with the status of the electrical deliverables. This allowed me to report the progress of the electrical design in a weekly coordination meeting with the other engineering disciplines, and enabled me to report any budgetary issues that arose.

Claim 14. Problem analysis

As an electrical engineer on a major water project in Adelaide, my role was to produce electrical and instrumentation concept design documentation for various sites around the Adelaide metropolitan region. This responsibility included specifying new instrumentation equipment and instrument installation details to allow for control and monitoring of sites remotely.

One of the sites consisted of a new pumping station, an inlet valve building and a reservoir for water storage. Part of the requirements for overall site control involved the measurement of the reservoir water level. I identified that the current method of level measurement involved the use of an ultrasonic level transmitter mounted on top of a concrete pillar, which contained a pipe that was installed vertically and connected to the outflow of the reservoir. I knew that the current method of level measurement would need to be changed, as according to the local residents, the concrete pillar had a negative effect on the aesthetics of the site. I also identified that the current installation resulted in maintenance personnel having to work at heights, which contradicted the client's OH&S policies.

I conducted a site visit around the reservoir in order to formulate level measurement options to present to the client. I then arranged a meeting with the relevant stakeholders to discuss the issue. During the meeting, it was agreed that analogue level measurement of the reservoir would be required, with digital signals required for extra high level and extra low water level. It was proposed that an ultrasonic level transmitter and float level switches would be used to provide the signals. The ultrasonic level transmitter was to be installed on a 100mm diameter stilling tube sloping from the top to the base of the reservoir, which enabled the instrument to be located at the reservoir walkway level to allow for ease of maintenance.

After analysing the proposed option, I realised that the use of ultrasonics and level switches would not be suitable for the application, as the beam angle required for accurate ultrasonic level measurement could not be achieved due to the combination of the stilling tube diameter and the proposed angled installation method. I also identified that as the cables connected to the float switches were unrestrained, it would be difficult to measure the extra low water level using a float switch.

I then contacted an instrumentation supplier with my concerns and to discuss potential solutions. The supplier proceeded to put forward a recommendation of using laser level transmitters, which measures the level at a single point, thus eliminating the problem related to the beam angle. The proposal included the installation of two transmitters, one providing continuous level measurement and the other providing the extra high/low level signals. I investigated this option and found out that the disadvantages included the need to introduce a reflective surface on the water, and the high upfront cost in comparison to the use of ultrasonics.

I discussed the viability of the laser level transmitter with a client representative, who indicated that the use of reflective surfaces would not be preferable. He suggested replacing the laser transmitters with hydrostatic pressure transmitters installed at the bottom of the tank, as this configuration had been used previously at another of the client's sites. I forwarded this option to the instrumentation supplier, who agreed that this option was viable and would result in accurate level measurement. I concluded that the hydrostatic pressure transmitter would be the preferred option due to the low cost and high reliability of the instrument.

In order to ensure that the pressure transmitters were installed at the bottom of the reservoir, I decided to specify a pulley system, installed within the stilling tube. I designed the system such that a suitable

length of rope was used to ensure that the pressure transmitter would be able to be located at the bottom of the reservoir. The increased weight of the pressure transmitter compared to float switches would ensure minimal drift as well. I captured all these requirements on an instrument datasheet and an installation drawing, which were then reviewed and approved by the client.

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