

## **PERSONAL ASSESSMENT AGAINST UK-SPEC**

*A1. Maintain and extend a sound theoretical approach in enabling the introduction and exploitation of new and advancing technology, and other relevant developments.*

I have been very pro-active in bringing in new technology into my company. This is especially true in areas like 3D CAD, and Finite Element Analysis. Also in managing the change from predecessor methods. I strive to improve my own technological capability by reading journals, practise in the use of software, and specialist courses. I have introduced many kinds of technical software to the company, where a need is identified, and there was potential to improve product analysis, performance, and increase the efficiency of the design process.

*A2. Engage in creative, and innovative development of engineering technology, and continuous improvement systems.*

As I work for a development company, a major part of my role concerns the development of new products, and product improvement. This includes development of products to appeal to a large market, and development of products to meet a customer's particular requirement. Much of this work involves special mining equipment, and mechanical power transmission systems. I have carried responsibility for mechanical design of very large fully mobile mineral sizing plants, with a mass of around 2,000 tonnes, and a value of around 10 million pounds. As an example of my innovative work, I have designed a device to split power transmission equally between two paths, and a patent covers this design. As an important part of my company's quality system, I have developed a system to monitor, and chart complaint data, from products in service, to evaluate design process performance and check the extent to which the drive towards continuous improvement is being achieved.

*B1. Identify potential projects and opportunities.*

I work for a company that operates in a competitive market, in an industry which is depleted in many areas, and has no significant UK market. The company has a fundamental need to offer ever-improving products for its survival. The search for new products and product enhancement is continuous. An example of identification of a product introduction opportunity is the development and introduction of a chain tension device, This product is an optional extra, for tensioning chains on chain conveyors, by using a small hydraulic motor and utilising the mechanical advantage of the main drive gearbox.

*B2. Conduct appropriate research, and undertake design and development of engineering solutions.*

The most efficient design solutions can be obtained by collection of design data by research and measurement, then using this data to complete the design. I have designed a large gearbox (18 tonnes) for a rock crusher

transmission, which is now entering service. The first step in this design task was to evaluate relevant data. This was used to produce representative design, loads and a design specification. The exercise presented many design problems, but the initial research made the provision for the design to be carried out, and then reach an efficient solution. I have undertaken other projects requiring research, to reach engineering solutions. Notably, I had key involvement with a hydro transport device for oil sand, and I have designed a shock damping system for stone feeders used in mining. I have involved universities for assistance in specialist research into specific design problems.

*B3. Implement design solutions, and evaluate their effectiveness.*

As a part of the quality system which I operate in my department, design planning, design review, verification are important components of it. Planning makes provision for review, verification and validation. Verification is the process which as far as practically possible checks that the design will function, per the design intent. This might involve modelling and testing, but more usual is modelling the relevant situations using computer software or calculations techniques. Review is a tool used to look back at the design input and the required outcomes in the specification. In this way the outcome is evaluated against the original specification. Validation usually takes the form of a site visit which will be a general check, inclusive of the customer's opinion that the design has completely met the original requirements.

*C1. Plan for effective project implementation.*

As my role includes overall responsibility for mechanical, I write, or have key involvement in the planning of design projects. This will usually include:

- Identification of important features
- Resource planning
- Identification of special resources
- Schedule information
- Design methods
- Verification planning
- Managing work
- Review arrangements

If the design project concerns development, and a particular customer is not involved at that stage, then I am often required to draw up a design specification, for the design team to work with. On occasions I have also been involved with negotiation of technical design issues. For instance, load cases with customers, and/or their representatives.

*C2. Plan, budget, organise, direct and control tasks, people and resources.*

In my working role I often write some of the company's technical procedures, which form an important part of the quality system. These procedures cover aspects of design, and quality standards for manufacture. I am involved in the

planning project schedules, but whilst I have written some of these myself they are usually constructed by others using appropriate software. Organisation and leading of work teams usually involving engineering design is a key area in my role. This aspect is normally carried out in a meeting or discussion. Providing concessions and problem solving through rectification procedures when manufacturing problems arise, is another key area of my responsibilities. In the quality system I am a point of feedback on issues like assembly problems, or equipment performance issues. I update procedures, recommend and implement required changes.

*C3. Lead teams and develop staff to meet changing technical and managerial needs.*

My company has offices worldwide, some of which employ their own project engineers, usually joining the company at graduate level. When they join the company, they sometimes come to my department for training. After initial discussion, I draw up training plans and they work through the plan under my supervision.

This is an indication of how you can write a report to demonstrate you have met the professional competencies. Please refer to our web site, [www.ied.org.uk](http://www.ied.org.uk) to see the full list of UK SPEC professional competencies.