Institution of MECHANICAL ENGINEERS

MPDS Toolkit

MPDS is endorsed as a QA pathway to professional registration by the Engineering Council[UK]

The Monitored Professional Development Scheme

1 Birdcage Walk, London SW1H 9JJ

Telephone: 0845 226 0211

This TOOLKIT can be downloaded from the e-MPDS 'help' section online

Improving the world through engineering

Contents

Section 1

SCORING FOR UK-SPEC

Consistent scoring and developing best practice across the engineering profession is the aim of the Institution of Mechanical Engineers (IMechE) and the Engineering Council.

These level descriptors provide guidance for mentors to score levels for **total competence** as a professional engineer. They are used for both Incorporated (IEng) and Chartered (CEng) engineers.

The Institution is not too prescriptive about the scoring mechanism as it is possible that you may be benchmarking against other developing engineers within your company.

The Institution will assess against the end result the mentor gives on completion of the Monitored Professional Development Scheme (MPDS), when the individual will come forward for professional registration. Many mentors therefore use 'overall competence as a professional engineer' as their guideline for scoring competence throughout MPDS development. This would therefore show a progression of scores over the period of development.

Scores 0-4 are used in e-MPDS, which is the online recording system to log a developing engineer's progress. Level zero denotes the competence is not relevant at this stage of development. Generally, using the following guidance, it is unlikely that individuals in year 1 of development would be scoring at level 4.

The minimum scores for consideration for professional registration and corporate membership of the Institution is 3x3's and 2x2's in the 5 UK-SPEC competences.

Level 1 = **AWARE:** Performs the activity with significant supervision and guidance; performs basic routine and predictable tasks; little or no individual responsibility. *(This level of competence would not normally be sufficient for election to membership)*

Level 2 = **FAMILIAR:** Performs the activity in a range of contexts; supervision only required in more complex circumstances; some individual responsibility or autonomy. *(This indicates a minimum level of competence for election to membership, which should be supplemente, by higher levels of competence in the areas most relevant to the field of engineering in which the applicant is employed).*

Level 3 = **SKILLED:** Performs the activity in some complex and non-routine contexts; significant responsibility and autonomy; can oversee the work of others. *(This indicates a normal level of competence for election to membership).*

Level 4 = **EXPERT:** Performs the activity in a wide range of complex and non-routine contexts; substantial personal autonomy; can develop others in the activity. *(This indicates a high level of competence and suitability for election to membership and possibly fellowship)*

The requirements for professional registration are competence and commitment. The reports provided to us at the professional review are the evidence that demonstrate your competence and commitment.
To download a copy of UK-SPEC please go to:

http://www.imeche.org/profdev/mpds/underukspec/

Section 2

EXAMPLE REPORTS

QUARTERLY REPORTS

If you use the simplest method of reporting for MPDS, without using option tools such as Plans and Evidence, UK-SPEC must be clearly outlined as per this example of good practice.

- **Go to Reports**
- **Create Quarterly Report**
- **Type the date of the report period**
- **Add your objectives**
- **Type your report details or cut and paste from a word document into the quarterly report area**
- **Use the 'first person' style of writing as per the fist paragraph below**
- **Outline your activities, roles, responsibilities and learning outcomes (Reports should be no more than 500 words. Reports can accommodate an overspill of text of up to 750 words maximum).**
-

NOTE: UK-SPEC drop down menu has not been used and as a result, there will be no competences auto-mapped to the 'checksheet' or mapped over into your annual assessment.

(Example used with permission of owner)
I worked with Nacco Materials Handling Group for a week in The Netherlands to primarily ensure that the calibration I developed for a new Tier III QSB6 powered Empty Container Handler met both the requirements of the customer, and, Cummins specifications. Firstly I recorded the active fault codes and modified the calibration to eliminate those that were associated with it. I was involved in direct discussions with the customer to clarify the functionality and control of certain engine features at this stage. Further to this, I changed the throttle settings to remove a low idle 'deadband' and the engine governors were tuned. This experience was extremely rewarding in

terms of enabling me to extend my knowledge of the new Core 2 software and ndot governor tuning control used in Tier III calibrations. I gained full appreciation of user requirements as well. (A1) (B2) (B3) (D2) (E2)

Another of my tasks for this quarter was to update the Cummins OEM Interfaces and Components Control Module Electrical Subsystem Technical Packages for the automotive market. This work has been very interesting and valuable to me as I had worked on industrial products up to this point. It has helped me to explore and appreciate what those in the other part of the applied controls group are involved in. (A2) (C2) (D3)

The biggest responsibility of this quarter has been given the JCB account to look after from a Controls standpoint. It has been a challenge that I have relished and I feel it has helped me to become more independent within my role and significantly increased my confidence and flexibility in dealing with new and changing situations. I have also benefited from this role because of the exposure it has given me to other aspects of the engine such as mechanical limitations and emissions legislation. I have been constantly involved with a number of JCB applications for Tier III compliance and actively participate in a weekly call with the customer. This has been essential in helping me to prioritise my work and develop my interpersonal skills. (A1) (A2) (B1) (C1) (D1)

In this quarter the EiS community project, that promotes engineering to local students, was carried out over 4 days. The day's agenda was based upon the general engineering methodology of Brief, Investigate, Design Specifications, Generate Ideas, Evaluate, Detailed Design, Manufacture and Working Prototype. The activities throughout each day were extremely well received and executed by those involved. I used this experience to gain an appreciation of how I can lead and support a group of people, albeit students, through an engineering process. (C3) (D2) (D3) (E1)

Other work has included involvement in the development of Tier III calibrations for a variety of customers, with numerous applications, throughout Europe. The development of these calibrations has been vital for me as it not only means I can understand the software logic, but it also helps me to learn about why the features are needed and how they work. (A1) (B3) (C1) (E4)

Section 2

EXAMPLE REPORTS

An e-MPDS QUARTERLY REPORT
Using Evidence submissions

Note: This example shows how text is restricted in Plans and Evidence. Brief notations are suggested, rather than lengthy elaboration. The evidence submission acts as a reminder for items to include in the quarterly report synopsis.

MPDS – Quarterly Report – Chartered Engineer

Year 1 Quarter 3

Surname: xxxxxxxxxxxxx Forename(s): Barry **Membership Number:** 8001000

Notice: no plan approved for this quarter

Competences:

- CE-A.1-Maintain and extend a sound theoretical approach in enabling the introduction of new and advancing technology and other relevant developments
- CE-A.2-Engage in the creative and innovative development of engineering technology and continuous improvement systems
- CE-B.1-Identify potential projects & opportunities
- CE-B.2-Conduct appropriate research, and undertake design and development of engineering solutions
- CE-C.1-Plan for effective project implementation
- CE-C.2-Plan, budget, organise, direct and control tasks, people and resources
- CE-C.4-Bring about continuous improvement through quality management
- CE-D.1-Communicate in English with others at all levels
- CE-D.2-Present and discuss proposals
- CE-D.3-Demonstrate personal and social skills
- CE-E.1-Comply with relevant codes of conduct
- CE-E.2-Manage and apply safe systems of work

Evidence submitted during this quarter:

• Electrical assessment form Year 1 Quarter 3 19 Aug 2005 Location: GPAF Barry Electrical.tif

Notes:
graduate placement assessment form for my time on the electrical section

Review:
Reviewer: XXXXXXXXXXXXX Date:26 Aug 2005 Status: Accepted

Reviewers Notes :

Associated Competences :

• Manufacturing assessment form Year 1 Quarter 3 19 Aug 2005 Location: GPAF Barry Manufacturing.tif

Notes:
Graduate placement assessment form for my time in Alstom Train manufacturing plant, Barcelona
Review:
Reviewer: XXXXXXXXXXXXXX Date:26 Aug 2005 Status: Accepted

Reviewers Notes :

Associated Competences :

• MA set Turnkey Year 1 Quarter 3 22 Aug 2005 Location: excel tables in personal folder
Notes:
I have been working on a project, which involves the engineering support for the conversion of Mark 3 Trailer Standard Open (TSO) coaches by adding a buffet facility. A more powerful motor-alternator set is needed to meet the increased current demand of the modified vehicle. This more powerful MA set is going to be taken from other redundant vehicles and will be fitted to the TSO, together with other electrical equipment. 11 major electrical locations were identified and it was my job to identify the components that were in each location. I did this by using illustrated
parts manuals, electrical schematics, wiring diagrams and general arrangement drawings. After finding the components in each box/location it was necessary to find out how they were wired together.
Review:
Reviewer: XXXXXXXXXXXXXXXXX Date:26 Aug 2005 Status: Accepted

Reviewers Notes :

Associated Competences :

- CE-A.1-Maintain and extend a sound theoretical approach in enabling the introduction of new and advancing technology and other relevant developments (Level: 1)

- CE-B.2-Conduct appropriate research, and undertake design and development of engineering solutions (Level: 1)

- CE-C.1-Plan for effective project implementation (Level: 0)

• Co-ordination of proposal for graduate placement Year 1 Quarter 3 22 Aug 2005 Location: In personal folder
Notes:
I volunteered to arrange a meeting that would discuss a possible opportunity for sending graduates to gain some infrastructure experience working for Network Rail. I arranged a meeting and from the meeting it was decided a letter should be drafted. I spoke with a former graduate who has worked closely with Network rail and was able to find from
him the types of work which Network Rail conduct in their premises in Derby. I drafted a letter trying to put forward a convincing argument. I was told it was too long for the person which I was addressing, and the request wouldn't be granted if not worded in the right fashion. I therefore revised it and the letter was then sent. A positive reply was later received.
Review:
Reviewer: XXXXXXXXXXXXXX Date:26 Aug 2005 Status: Accepted

Reviewers Notes :

Associated Competences :

- CE-B.1-Identify potential projects & opportunities (Level: 1)

- CE-D.1-Communicate in English with others at all levels (Level: 1)

- CE-D.2-Present and discuss proposals (Level: 1)

• Manufacturing Placment Year 1 Quarter 3 22 Aug 2005 Location: In personal folder
Notes:
I was based in the logistics department for my manufacturing placement. In the first week I was trained in a lean manufacturing tool, developed for xxxxxx. It was called MIFA, and stood for Material and Information flow analysis. It was a tool that used a simple graphical representation of the flows from suppliers through to the fabrication line, and allowed for easy identification of areas of 'waste' such as duplication of processes of excessive time being stored
as WIP. After the first week of training which involved carrying out two guided analyses I was given the

responsibility
to carry out my own MIFA's. The first and largest was for four weeks and included a detailed study of the flows relating to the aluminium profiles for one of the Alstom projects.
Review:
Reviewer: XXXXXXXXXXXXX Date:26 Aug 2005 Status: Accepted

Reviewers Notes :

Associated Competences :

- CE-A.1-Maintain and extend a sound theoretical approach in enabling the introduction of new and advancing technology and other relevant developments (Level: 1)

- CE-A.2-Engage in the creative and innovative development of engineering technology and continuous improvement systems
(Level: 1)

- CE-B.2-Conduct appropriate research, and undertake design and development of engineering solutions (Level: 0)

- CE-C.1-Plan for effective project implementation (Level: 1)

- CE-C.4-Bring about continuous improvement through quality management (Level: 0)

- CE-D.2-Present and discuss proposals (Level: 1)

- CE-D.3-Demonstrate personal and social skills (Level: 1)

- CE-E.1-Comply with relevant codes of conduct (Level: 0)

- CE-E.2-Manage and apply safe systems of work (Level: 1)

- CE-E.4-Carry out continuing professional development necessary to maintain and enhance competence in own area of practice (Level: 1)

• Preparation for placement in train manufacturer in Spain Year 1 Quarter 3 31 Aug 2005 Location: In personal folder
Notes:
I invested considerable effort in organising a manufacturing placement in Spain. I wanted to work for a manufacturer that built new trains and I also wanted to use a further opportunity to improve my Spanish. After gaining approval from xxxxxxx by presenting a budget and reasons why I thought a placement abroad would be valuable, then got in contact with an Alstom manufacturing site in Barcelona. I needed to translate various documents to Spanish and send various emails to explain the objectives of a manufacturing placement. I also co-ordinated a site visit by the xxxxxxxxxxxx HR manager and myself, to discuss possible projects and carry out a safety visit.
Review:
Reviewer: XXXXXXXXXXXXXXX Date:21 Sep 2005 Status: Accepted

Reviewers Notes :

Associated Competences :

- CE-B.1-Identify potential projects & opportunities (Level: 2)

- CE-C.1-Plan for effective project implementation (Level: 1)

- CE-C.2-Plan, budget, rganize, direct and control tasks, people and resources (Level: 1)

- CE-D.2-Present and discuss proposals (Level: 1)

- CE-D.3-Demonstrate personal and social skills (Level: 2)

- CE-E.1-Comply with relevant codes of conduct (Level: 1)

- CE-E.2-Manage and apply safe systems of work (Level: 2)

- CE-E.4-Carry out continuing professional development necessary to maintain and enhance competence in own area of practice (Level: 2)

Quarterly Report:

During my time on the electrical section I accompanied an engineer to a depot to learn about fitting and testing electrical equipment. I helped fit some OTMR equipment, which has a similar function to a black box on an aeroplane, and a data logger to the control system of an engine on a class 43 locomotive which had been experiencing engine shutdown. It was important to fit the diagnostic device in order to establish the reason for shutdown. Both
experiences helped me appreciate the need to set up a safe systems of work.

Principle project involvement is the conversion of Mark III Trailer Standard Open (TSO) coaches by adding a buffet facility. A more powerful motor-alternator set was needed to meet the increased current demand of the modified vehicle. My work involved identifying the electrical systems located on the underframe, which I modified to accommodate more powerful MA sets. I identified 11 major electric components and used the illustrated parts manuals, electrical schematics, wiring diagrams, photos from the boxes and general arrangement drawings and found out how they were wired together.

I pursued and arranged meetings for a placement and identifying the scope of same. I prepared the correspondence that ultimately led to an agreement to accommodate me on mechanical graduate placement.

I also arranged my manufacturing placement in Spain. I arranged a Safety visit at the Barcelona factory and I visited the site to discuss the work which I would undertake whilst there. I witnessed the various activities in the factory and ensure that they controlled all risks to safety. I also had to arrange accommodation and flights.

I was based in the logistics department and introduced to a lean manufacturing tool, called MIFA, Material and Information Flow Analysis. I used this for simple graphical representation of the flows from suppliers through to the place where they are used, allowing me to identify areas of 'waste' such as duplication of processes or excessive time being stored as WIP. This study lasted 4 weeks and included a detailed study of the flows relating to the aluminium profiles for one of the xxxxx projects. The main problem was that they were storing a lot of stock, so I looked at the financial implications of this, which involved creating a spreadsheet that would correctly identify the value of the WIP on various dates, and how much it cost to store it. My recommendations included changing the planned orders to allow for a reduction in WIP. In my final week I carried out a process mapping technique of internal material flows for the process of soldering a headstock. At the same time I was responsible for aiding the training of two work experience students who would carry on the material flow studies after I finished. I was also able to speak with people in other departments such as engineering, production and quality to learn about their impact on train manufacturing activities. I also improved my Spanish as I had to gather information from many different people from around the factory, and present my findings to the Engineering Director.

Developing Engineers Evaluation of the period:

I have really enjoyed being able to work in a Spanish factory in order to gain an insight into manufacturing operations and also with the chance to improve my technical Spanish. I also liked working in the electrical section where I was able to be involved with the MA set turnkey project, and was able to be given the responsibility of correctly identifying all relevant electrical components.

Mentors Review :

Another confident period of development and xxxxxxxx is clearly moving forward and gaining further confidence and competence. Xxxxxxxxx learnt a lot from his placement in Spain and it was a good opportunity to develop further language skills. Xxxxx has become a reliable member of the team.

Status: Accepted

Status Date: 21 Sep 2005

Note:
The best practice method of Quarterly Reporting:

Best practice is to:

- **Lodge a plan**
- **Submit evidence**
- **Then write your Quarterly report with the UK-SPEC in brackets after each paragraph, as per page 4**
- **This should be done in this order to ensure that the information from the Plan and Evidence items maps into the Quarterly Report**

Section 3

EXAMPLE REPORTS
MENTOR COMMENTS - ANNUAL ASSESSMENT

- The Annual Assessment is generated by the Developing Engineer.
- The content under A B C D and E competences of the Annual Assessment is not shown here. However, the information in each competence area of the Annual Assessment is auto-mapped from the 'evidence' submitted throughout the year. The Developing Engineer can type in additional items in these competence boxes if they wish. When the report is 'Saved' it is auto-sent to the mentor to insert the competence scores for A B C D and E.
- The mentor will also complete the following section of the Report:

(Used with permission of owner)

1. Main responsibilities in the post/s held during this period
A list of the XXXXXXXX sections that xxxxxxxx has worked in together with his main roles : Business Consulting Finding data and helping write a presentation given by the Strategic Projects Director at a conference of clients held in Sweden. Researching potential commercial opportunities for the Business Consulting section across Europe. Mechanical Learning about how to use the Finite Element tool Ansys to solve structural problems of a control rod and helping with a survey assessing the condition of a fleet of vehicles. Electrical Two visits to depots to fit electrical equipment (including night work) and involvement with the electrical implications/changes within a turnkey project of the conversion of a mark 3 coach. Audits and Safety Creating and developing resources to support xxxxxxxxxxx's work as a Notified Body. Two product and process audits and a corrosion inspection of a sample of a fleet of vehicles. He has also done a practical engineering course and a 6-week manufacturing placement with xxxxx in Spain (where he conducted studies of Work In Progress).
2. Assessment of performance; detail notable successes or failures
Confident start to career within Railway Consultancy. Design build project at Rugby successfully completed. Self motivation enabled an overseas placement to be realised that allowed xxxxxxxxx to improve his technical Spanish.
3. Details of any technical, commercial or management courses which the graduate has attended

	Personal Track Safety Course; Traction and Rolling Stock Course; Depot Awareness and Various Technology Briefings; Presentation Skills Course
4. What role/s will be undertaken by the Developing Engineer in the next twelve months and how will these help him/her to develop the competences required for this chart?	
	xxxxxxx will be finishing off the graduate training scheme with remaining placements in Sales and Marketing, Maintenance, Rolling Stock, Railway Systems and Infrastructure, and a regional office placement in London. He will also carry out two depot placements and is investigating a secondment to Melbourne. xxxxxxx to undertake more work with a technical content to build up his knowledge of engineering disciplines and how they are used in the railway industry.

EXAMPLE REPORTS

MENTOR COMMENTS - QUARTERLY REPORT

YR2 Q3: (Used with permission of owner)

Engineer's Evaluation of the Period: An interesting 3 months in which I have developed my knowledge in the field of alternative fuels and vehicle emissions and significantly grown my network of contacts. I have had the opportunity to lead and manage others while my work in particulates measurements allowed me to develop deep technical knowledge in a specialist area.

Mentor's Review: Technical report writing skills have improved and there is distinct improvement in the presentation of this report. Good cross business exposure continues. Xyz is growing in confidence through his personal interaction within, and through supplier involvement. Xyz has joined the engineering analysis team and successfully managed the vibration damping trials. Objectives for the quarter have been met. There is continued technical and personal growth in a very promising Developing Engineer.

Status: accepted **Status date: 4th April 2005**

- **Mentor comments assist the individual through feedback**
- **Mentor comments help plan the next period of development**
- **Mentor comments ensure the individual looks for opportunities to develop competence**

- **Mentor comments assist the professional review interview panel**
- **Mentor comments are evidence that monitoring has occurred**

Section 4

Contacting the Institution of Mechanical Engineers

Membership Enquiries **0845 226 9191**
membership@imeche.org

- academic assessment queries
- Is my degree accredited?
- Do I need Further Learning?
- membership fees and subscription queries
- upgrading from Affiliate to Associate
- upgrade from Associate to Member

Further Learning Helpline **0207 304 6866**

MPDS Helpline **0845 226 0211**
mpds@imeche.org

Web Links:

www.imeche.org - to log on to the IMechE Homepage

http://www.imeche.org/membership/become/member/

for guidance on

- becoming a registered CEng or IEng member of IMechE
- guidance for the professional review

http://www.imeche.org/profdev/mpds/getmpdsorganis/

for guidance on

- company accreditation
- mentor roles and responsibilities
- mentor guidelines
- UK-SPEC
- FAQ's for individuals and organisations
- undergraduate student information and forms
- download MPDS Registration Form
- download MPDS Transfer Form
- download MPDS Mentor Registration