TECHNICAL REPORT GUIDANCE

Institution of Gas Engineers & Managers

INTRODUCTION

The Technical Report Option is a p rocess that allows applicants to demonstrate their academic knowledge to either BEng (Hons) or MEng level without the need to complete an accredited course.

The purpose of the Technical Report is to verify that you have attained the required knowledge, understanding and application of the underpinning scientific and engineering principles, to the required standard, through your education, career and professional development. The standard required correlates to the general and specific learning outcomes expected from the relevant exemplifying qualification, Bachelor level (IEng) and Master's level (CEng) particularly in the areas of underpinning science, maths and engineering analysis.

The Technical Report Option is broken down into four steps. The first is the preparation of a 500-word synopsis. Once the synopsis has been completed and approved by our Academic Panel you will be able to move onto the second step, writing the Technical Report. This is the step that requires the most time and work. Upon successful completion of your written report you will then be invited to an interview and asked questions based on your report. Once the Technical Report has been successfully completed you move onto the Professional Review stage.

This process is neither easier nor more difficult than completing an accredited course, it is simply an alternative.

Step 1 500 word synopsis

Step 2 Technical Report

Step 3 Technical Report Interview

Step 4 Professional Review

MENTORS AND THE PROCESS

Mentor

IGEM has a large pool of mentors trained to give you support as you work towards professional registration. They are most commonly used to help applicants through the Technical Report Option process but can also help applicants with the professional review stage as well. Due to the success rate of applicants with a mentor compared to those without, IGEM require you seek the support of a mentor before starting the Technical Report Option. The mentor service is provided free of charge. To request a mentor simply e-mail a current CV to **membership@igem.org.uk**.

The background, encouragement and advice that the mentor brings can help you to develop the outline subject of your technical report at an early stage in the process. In particular, the structure, content and outcome can be developed in order to afford you the best lead in to preparing the technical report. If the assessors are to be convinced by the argument, structure and technical content of the papers they must be well planned.

Planning should begin when selecting a subject or topic for discussion and continue throughout the preparation and writing of the work. The mentor can advise on drafts, content and subject matter as appropriate and provide challenges and general comment on a final draft. Your mentor must not contribute to the content or style of the Technical Report in any form. In addition, the mentor may advise you on interview preparation including presentation, style and technique as appropriate to suit your background and experience, but must not contribute to the script or aid the delivery in any way.

Step 1 – Synopsis
The synopsis is a tool that our Academic Panel use to determine if a technical report will be based on an appropriate subject and is likely to lead to a successful outcome. The purpose of the synopsis is to allow the Academic Panel to give guidance and advice before you start the report that could be up to 10,000 words long. The synopsis should be structured as outlined below:

Part 1: Contents list
Contents list for proposed Technical Report.

Part 2: Topic idea statement
This will describe to the Academic Panel what you plan to write about. Remember that the panel are looking for you to demonstrate your personal understanding of the underpinning principals of science, maths and engineering related to your chosen topic area, all in order to bridge your academic shortfall i.e. to BEng level for IEng and MEng for CEng.

Demonstration of management skills is not required for the Technical Report , these will be explored at the Professional Review stage. In this respect, project reports, however interesting, usually have a mix of management and technical content and are therefore not suitable for a Technical Report although the technical aspects may still be a potential topic area. The technical content of any earlier report you may have written for work purposes, published paper or any patent under your name may also provide a basis for a Technical Report.

Please be aware that focusing on the underpinning science, maths and engineering aspects also avoids the potential impacts of commercial confidentiality, legal proceeding and/or security issues associated variously with pending, current, recent and/or disputed projects.

Part 3: Personal role statements
This section will describe how you were involved in the project, how you came up with a solution and how you conducted the research etc.

Part 4: Academic level statement
You need to be clear on what you are writing the report for and how you will demonstrate academic knowledge to either Bacholor level [IEng] or Masters level [CEng]. You should details the Engineering Principles to be discussed in your report here.

A template is available upon request. Please contact Membership Services at **membership@igem.org.uk**.

Step 2 – Technical Report

Once the synopsis has been approved, it is time to write your report. When the Academic Panel approves your synopsis they will also advise how long your report should be. The length of the report will vary (between 2,000 – 10,000 words) depending on your qualifications. The greater the academic shortfall the greater the need for you to demonstrate that through your compensating experience you have gained personal knowledge and understanding of the underpinning scientific and engineering principles to the required level.

A Technical Report, which has been written for a technical publication or for circulation within your own organisation or prepared as part of an appropriate National Vocational Qualification or company training scheme, may be acceptable provided that it satisfies the IGEM criteria. Such a Technical Report may bear the names of one or more co-authors, and if this is the case, it will only be acceptable if your individual contribution is completely identifiable; if necessary, supporting documentation may be submitted to establish credibility.

The Technical Report will be assessed by two trained assessors who will be looking for a clear, logical and focused approach in the paper to the solution of any engineering problem and how a variety of techniques could be applied and verified to that solution. They will be seeking to ensure that any apparent shortfall in the knowledge and application of underpinning scientific and engineering principles has been addressed during your professional development.

A copy of the assessor marking criteria is available upon request.

Step 3 – Interview

Once the assessors have accepted the report, you will be invited to attend an interview normally within six weeks of acceptance.

The Technical Report will form the main agenda for the interview and you must therefore understand the technical content and be able to discuss the subject in detail. You will not necessarily have to explain complex theories but you must be able to demonstrate a clear understanding of how and why these have been used, what outcome was expected and if the result was different, why it was different. Areas of perceived weakness will be explored to the satisfaction of the assessors.

The interview will normally last between one and one and a half hours and take the form of a discussion between peers who will challenge the development of technical points, ideas and the direction of research identified from the initial review process to identify if areas of weakness have been addressed through professional development.

Following the end of the discussions you will be invited to ask questions and to summarise or clarify any points if you wish. Following the interview, the assessors will review your performance and complete the assessment sheets.

Step 4 – Professional Review

Successful applicants will be invited to proceed to the assessment of competence through the Professional Review Report and interview. Please contact Membership Services for further information on this step.

Writing your report

The Technical Report should be of a high quality with attention to grammar and spelling and presented in a logical, coherent and clear format. Quality is more important than quantity as the assessors must be able to make a judgement from the information provided to them. You must read the finished papers very carefully before submitting them for assessment. Remember: deficiencies in spelling, grammar or sequence will detract significantly from its overall acceptability. Low quality submissions will be rejected.

The Technical Report should offer an ordered and critical exposition of aspects of engineering practice in which you have played a major part, defining problems and describing how you resolved them by the application of engineering principles to either Bacholor level [IEng] or Masters level [CEng], and should clearly demonstrate the depth of your engineering knowledge and understanding. It may be appropriate to select a specific project in which you have had considerable involvement and responsibility to form the basis of the report. It should be noted that the project must be used to demonstrate your personal knowledge and understanding required for the defined competence.

Professional Engineers must be able to apply their expertise in situations for which no previous guidelines or solutions are available and so the assessors will be looking for the application of engineering principles to either Bacholor level [IEng] or Masters level [CEng] and a logical approach to problem solving.

It is important that you appreciate the distinction between application of engineering principles and merely the employment of good practice. The institution accepts you may hold a management position in your organisation. However, a report of work in which you have acted essentially in a supervisory or managerial role, with little direct technical input, will not be satisfactory. Most applicants will find it more beneficial to concentrate in depth on one engineering achievement or project in which they themselves played a major technical role rather than cover a wider field.

You may find it helpful to draft a longer report and then edit it down to the required length as this often provides a more concise and factual document.

Introduction

This should state concisely the form that the Technical Report will be taking and should indicate the main topics, developments and points that will be covered. Although this appears at the beginning of the paper, it is often better to finalise this when the rest of the paper is written.

The main body of the work, research or engineering application

This contains the essence of the paper and may be divided into relevant sub sections. You will show that you know what the subject is about by describing the development of the paper more fully. This needs to be in sufficient detail to demonstrate an understanding of the issues with the application of engineering principles underpinning the arguments. There is a need to build and develop the theme as sections are exposed, so there should be a logical presentation in the ideas or information that are introduced.

The information that is provided should be backed up from acknowledged sources, industrial data, literature or external media and referenced accordingly. It may be useful to demonstrate links between ideas and be able to compare different sources of evidence. Analytical comment should be demonstrated when appropriate. Keep the theme of the paper focused on the title and topic chosen and make sure that the information given is relevant to the topic. You must make sure you do what you said you were going to do in the introduction and comply with the approved synopsis.

Illustrative diagrams, tables, charts, calculations and statistics should be included if they are necessary to support the development of the point. They must be correctly applied, clearly presented and where necessary properly explained so that the underlying theory can be followed. You must be able to understand and interpret them. It is very important to use recognised Sl units of measurement throughout the technical report.

Appendices may be attached to the end of the paper and are not included in the word count. They should only contain essential documentary evidence, research or drawings (including rough drawings and calculations) that support or explain a principle, development, outline or general background, published papers or historical data.

If you choose to use an existing Technical Report, you will be asked to produce a short supplementary paper containing comment on your particular contribution and an assessment of the knowledge and understanding gained. Pre-existing reports will only be acceptable if they comply fully with the IGEM and the Engineering Council's rules for technical reports.

Conclusion

It is here that the threads of the paper's development and argument are drawn together. The main points will need to be summarised, along with a demonstration of the logical development of how the points led towards a particular view with regard to the report's topic. It can take a variety of forms and include some or all of the following:

- summarise the results of your research, which point to a particular view on one or a number of issues;
- outline recommendations for action in a particular field, activity or engineering process;
- show how these views on the topic have consolidated or diverged because of the progress of the investigation;
- identify lessons learned with recommendations for further development or action; and comments on feedback and implementation of any of the actions.

The best reports often deal with one specific problem.

Referencing and Bibliography

When undertaking the work identified with the Technical Report it is expected that a certain amount of research and reading will be needed in order to gather information and become familiar with the topic. Where ideas from research and reading were used, they must be acknowledged in the text by reference or citing the sources of the information. It is important to adopt a consistent style to avoid confusion so that the assessors can trace the development of ideas and satisfy themselves that an appropriate programme of background investigation has been carried out. The potential dangers of plagiarism must be considered as the assessors may take the opportunity to review source information.

Checklist

Applicants are strongly encouraged to ask themselves the following questions before final submission of their Technical Teport:

Have I kept to the original topics agreed in the synopsis?

Have you discussed your final report with your mentor and recieved sign off?

Have I covered all the main points?

Have I gone into sufficient depth to demonstrate that I understand the underlying engineering principles and can apply them in a rigorous and logical manner?

Does it describe what I did and why I did it?

Are the points that I make relevant to the topic, argument or outcome?

Is the material that I use relevant?

Have I supported my themes, calculations and arguments adequately by using relevant theory, examples and references?

Have I set out my thought processes, what decisions I made and why?

If I instigated any changes, have I described why?

Have I described the results, good or bad?

Have I acknowledged all sources and references?

Have I protected any confidential sources, copyrights and industrial secrets?

Have I written clearly?

Have I remained within the word count?

Have I adhered to the presentation guidelines?

Have I completed the authenticity statement to the papers?

ASSESSMENT

What the Assessors are looking for

Both Technical Report assessors must be confident that you have acquired sufficient understanding of engineering principles through the combination of initial qualification, subsequent initial professional development and career development to be recommended for exemption from the formal academic requirements. Assessors will be looking for a clear, logical and focused presentation of an engineering problem and how a variety of techniques could be applied and verified to that solution.

A mix of objective and subjective criteria are used for the assessment. The standard expected would have regard to the general and specific learning outcomes expected from the relevant exemplifying qualification, MEng for Chartered and BEng for Incorporated applicants, particularly in the Areas of Underpinning Science and Maths and Engineering Analysis.

Your academic and industrial ability will be evaluated against theoretical benchmarks and knowledge and understanding levels in your career setting. The assessment will use an evidence-based structure of objectives and apportion achievement levels against relevant indicators.

Technical skills assessment

Technical skills will be assessed against the criteria. Skills will be assessed both summatively and formatively using an evidence-based evaluation of the field of work and the technical input achieved.

Theoretical knowledge evaluation

Theoretical knowledge will be challenged against published data, the application of engineering principles and depth of knowledge and understanding relevant to the type of registration sought (IEng or CEng).

Summative assessment

In order to check that you have attained the academic learning objectives at the specified level of competence Bacholor level (IEng) or Masters level (CEng), a short oral challenge of the underlying principles in the technical report will be carried out.

Formative assessment

These are used to identify your strengths and weaknesses in the paper. Progress towards the goals and conclusions can be monitored together with your understanding of the structure of and journey towards the agreed objectives.

Innovation and ideas development

The purpose is to explore your approach in identifying and resolving (not necessarily with a favourable outcome) new or open-ended problems. Any novel applications of theoretical principles or the sound development of accepted strategies for problem solving need to be exposed and identified.

Research background

You will be given the opportunity to review any research background material used and develop the context of the application of the data in the work.

Career Appraisal

Assessors will be seeking evidence that any apparent deficiencies have been compensated for through professional development and experience. They will also consider whether the deficiency is relevant to your specific career development and ability to become an IEng or a CEng, as appropriate.

FAQS

Finally

We appreciate that life can get in the way and it isn't unusual for a Technical Report to take up to a year to write. In our experience, stopping and restarting becomes very inefficient in the use of your time and aim to complete within 18 months. While you are writing the report you will be able to benefit from IGEM Membership. IGEM membership not only gives you access to mentor support but also various benefits including receiving up to date information about the Gas Industry via our journal, Gi, and our e-newsletter, the Flame. Plus there are great networking opportunities available via the various events we run throughout the county, many of which are free for IGEM members.

Join online at **www.igem.org.uk** or contact the membership Services team on **+44 (0)1509 678150** or email **membership@igem.org.uk** for a application pack.

FAQs

Do I need to complete the Technical Report? The Technical Report Option is exactly that, an option. One of the other options is to complete an accredited course. IGEM can't recommend one or the other as that will depend on your own personal circumstances and preferences but we will offer you support whichever option you decide to take.

I already have a great idea for a report; do I still need to complete a synopsis? Yes, although you may have done many reports that are very detailed and took a lot of work, they may not quite meet the criteria for a technical report. The best way to find out is to complete a synopsis for our Academic Panel to review.

Do I need a mentor? Yes. Applicants with mentors are much more likely to have their synopsis and technical report approved first time round and go on to successfully complete their Technical Report than those without a mentor.

I don't know anyone who can mentor me? Simply forward a detailed CV or a completed application form to **membership@igem.org.uk**. We will then source you a mentor who has a similar background or works in a similar field to you.

I already have a mentor at work, can they help me? The IGEM mentors have all been trained specifically to help you with the Technical Report. Whereas your mentor at work may be able to provide career and progression advice, IGEM require you to seek the aid of an IGEM trained mentor to help with the Technical Report.

I already have qualifications, but they aren't accredited. Do I need to do a Technical Report? If you are unsure whether your qualifications are accredited or not, simply complete an application form and send it in to the Membership Services team along with copies of your certificates and transcripts. We will then check your qualifications for you and inform you of the options available to you.

How long does the process take? That largely depends on you. The administrational process can take 6-8 weeks however that is dependant upon receiving your Technical Report and availability for interview.

What format does the report need to be in? The report can simply be emailed to **membership@igem.org.uk** as either a Word document or a PDF.

What happens if I fail? No-one fails the Technical Report Option, you might not be successful with your first attempt but guidance and feedback will be provided at every step. If you put the work in and use the support of your mentor, you will be successful.