Technical Report Synopsis Guidance
for CEng/IEng Registration

Technical Report Title: _____

Name: _____ **Mem no:** _____

Synopsis Requirement

You need to submit a synopsis of your proposed Technical Report to CIBSE for approval/ comment before proceeding with your report.

- **This should be submitted on this form and provide responses to each section**.
- The answer to **each** of the **FOUR** sections should not exceed **250 words** in length. (1000 words in total)
- You must set out clearly **how you intend to demonstrate your technical knowledge and understanding.**
- You must **identify the engineering principles involved** rather than, for example, just describing a project on which you have been working.

1. An outline of the proposed report, to include the planned structure with headings (ie a draft contents list). Your report would normally include:

- Describing a project you have been involved with, **or**
- An investigation or research project you have undertaken on some aspect of building services engineering.

During the early stages of building design the proposed height of a building is often in flux. Where building heights are restricted to meet developer, planning or architectural requirements the location and extent of lift plant rooms are critical as these often form the topmost element of the buildings structure.
There are a number of engineering solutions which could be applied to the vertical transportation lifting system to lessen the impact that the lift plant rooms may have on the planning height requirements. These solutions require careful consideration to ensure that the vertical transportation system remains code compliant and within the lift performance design criteria whilst remaining fit for purpose.

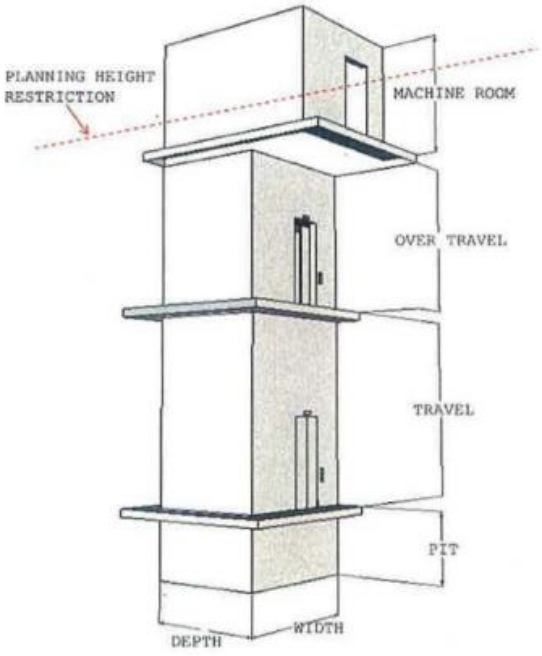

DIAGRAM SHOWING
PLANNING HEIGHT RESTRICTION

Proposed report content:
• Contents page Index setting out the contents of the report
• Introduction Background information and the reason for selecting the topic
• Key objective Identification and analysis of various lift engineering solutions which could be adopted to meet building height requirements
• Engineering Challenges Review of the challenges faced in determining a fit for purpose solution
during the early design phase of a project and how these may impact
on the building design and vertical transportation system
• Engineering principles Technical analysis of the engineering solutions which could be adopted
to reduce the height required by the vertical transportation system
• Conclusion Review of the possible solutions and comment on their advantages & disadvantages

2. Where and how you will include the underpinning science and mathematics and associated building services engineering disciplines. This will normally include evidence of:

- Understanding of the scientific principles of your own specialisation and related disciplines
- Awareness of developing technologies related to your specialism
- Knowledge and understanding of mathematical and computer models relevant to building services engineering and an appreciation of their limitations
- Understanding of concepts from a range of areas including some outside engineering, and the ability to apply them effectively in engineering projects

Locating the lift machine room to the side of the lift well is often considered a simple alternative to a conventional machine room directly above arrangement. This solution although simple in concept does carry inherent engineering design risks with long term implications on ride quality, design life and running costs.
Alternative new designs such as machine roomless and variable speed technologies together with architectural and lift engineering solutions need to be considered as possible alternatives.
This report will identify the requirements associated with building height restrictions and possible lift engineering, architectural or letting agent solutions which could be adopted to meet the height restrictions. The report will not only show how these solutions can reduce the overall height requirement, but how they may impact on the vertical transportation system as a whole. The report particularly focuses on the implication of placing the lift plant room to the side of the lift well compared to a conventional plant room directly above the lift well arrangement.
Mathematical calculations and computer generated lift traffic simulations will be used for the analysis. However it should be noted that at early design stage the input design data is largely estimated and that the traffic simulations are run against a best practice design criteria providing theoretical results which may not fully mimic the real world results.
Design teams need to be fully appraised of the risks associated with relocating the lift plant room and the possible alternatives.

3. Where and how you will include engineering analysis. This will normally include evidence of:

- Ability to use fundamental knowledge to investigate new and emerging technologies
- Ability to apply mathematical and computer-based models for solving problems in engineering, and the ability to assess the limitations of particular cases
- Ability to extract data pertinent to an unfamiliar problem, and apply in its solutions using computer based engineering tools where appropriate

Meeting planning restrictions through a reduction in the vertical transportation system height requires not only a review of the lift well and machine room dimensions in relation to the lifting strategy design criteria but due consideration must also be given to appropriateness and sustainability through the life of the installation.
This report will analyze the options available and consider alternatives ranging from basic aesthetic based architectural items such as a reduction in lift car height to the more complex engineering solutions of repositioning the conventional lift machine room to the side of the well. New and emerging technologies such as machine roomless lifts and variable speed lifts will be reviewed based on their potential to reduce the lift systems overall height requirements either through the removal
of the lift plant room or through a reduction in the lift over travel.
To fully analyze the difference between solutions mathematical calculations will be used to determine the estimated electrical energy consumption and heat-output of the lift machines which in turn will impact on the plant room cooling. The main hoisting rope life and the structural forces imposed on the building structure by the lift will be calculated to identify any additional building load requirements and determine the approximate life span of the hoisting ropes.
Lift traffic calculations will be carried out utilising the industry standard [redacted] software simulation package to determine the performance of the lifts against criteria as out in CIBSE Guide D.

4. Where and how you will demonstrate design awareness. This will normally include evidence of:

- Knowledge and understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations
- Ability to generate innovative solutions for products, systems, components and processes to fulfil new needs

All of the solutions identified are required to meet the basic requirements of the lift Directive 95/16/EC. One methods of demonstrating compliance in the design of lift systems for new traction lifts in new building is to follow the requirements of the safety rules for the construction and installation of lifts BSEN81-1. However where it is not possible to demonstrate compliance there is an option to deviate through the approval of notified body. New technologies such as machine ·room less and variable speed lifts are options that need to be considered, whilst new materials developed for traction and diverter sheaves together with new technologies in rope and or belt manufacture could improve the operation and maintenance life of the lift system where the machine room is located at the side of the lift well.
Detailed product design information from suppliers is often not available during the early design phase. To allow for a degree of competitive tendering all design inputs typically at this stage requires a degree of estimation. Understandings of the fundamental lift engineering principles are essential in determining a solution to the problem where the results are based largely on estimated design inputs drawn across a number of potential suppliers.
Placing the machine room to the side of the well is a commonly proposed solution which has a number of medium and long term engineering challenges which need to be fully articulated to the design team to ensure that the installation will be fit for purpose.