



BOARD OF ENGINEERS MALAYSIA

GUIDELINES NO. 003

THE ROLE AND RESPONSIBILITY OF PROFESSIONAL ENGINEERS IN EARTHWORKS AND BUILDINGS DESIGNED BY DIFFERENT SUBMITTING PERSONS

In exercise of the powers conferred by paragraph 4(1)(f) of the Registration of Engineers Act 1967 [Act 138], the Board of Engineers Malaysia hereby determines the Role and Responsibility of Professional Engineers in Earthworks and Buildings Designed by Different Submitting Persons as stated herein below:

1.0 INTRODUCTION

Engineering works for property development projects sometimes involves two different Submitting Persons for Infrastructures (Earthworks etc.) and Buildings respectively. This has resulted in what seems to be unclear role and responsibility between these two Submitting Persons in the event where distresses occur in the completed buildings or surroundings.

The Board of Engineers Malaysia (BEM) believes that these issues have to be resolved and wishes to remind all Professional Engineers to be clear of their role and responsibility for works under their care and maintain their documentation carefully particularly in cases where a next party takes over their completed works.

Some of the common problems are:

- 1) After a building is completed and handed over to the buyer, there are complaints on the settlement of the earthworks platform causing the building, apron, drains, car porch or services/utilities to crack and/or dislodge.
- 2) The building structure and foundation are designed without considering the ground conditions (e.g. magnitude of settlement, bearing capacity, existing cut and fill slopes, existing retaining wall, etc.).
- 3) The increased load due to the building onto the existing retaining wall causes the wall to crack or even collapse. In some cases, the building cracks due to the movement of the nearby retaining wall.

Note: For the purpose of this Guidelines, **Submitting Person** refers to Professional Engineer (PE) with Practising Certificate registered with the Board of Engineers Malaysia (BEM).

2.0 OBJECTIVE

The objective of this Guidelines is to ascertain the respective roles and responsibilities of Submitting Person for the earthwork and the other Submitting Person for the building of the same project.

When the client appoints Engineer A as a Submitting Person to design and supervise the infrastructure which includes earthworks and then appoints Engineer B as a Submitting Person for the Building, the works commonly entail the following:

- a) Engineer A as the Submitting Person for the Infrastructure shall design and supervise the infrastructure and earthworks platform that include:
 - Cut platform
 - Filled platform
 - Soil or Rock Slopes (cut or filled)
 - Retaining Walls
 - Water reticulation
 - Sewerage
 - Roads and Drains
 - Other civil works
- b) Engineer B as the Submitting Person for the Building, shall design and supervise the foundation and structure and internal services / utilities for the building.

Note: *Even if the project engages the same Submitting Person for both infrastructure / earthworks and Buildings, the Professional Engineer shall ensure all good engineering practice as recommended in this Guidelines are followed.*

3.0 RECOMMENDATIONS

1. Role and Responsibilities of Engineer A who is the Submitting Person for infrastructure and earthworks :

Engineer A shall:

- a) plan and supervise the Subsurface Investigation (S.I.) (e.g. boreholes, field and laboratory tests) to obtain the necessary parameters for analysis and design.
- b) design the platform to cater for the approved proposed development with due consideration for stability and deformation of the platform.
- c) ensure all slopes (cut or fill, soil or rocks) and retaining structures are safe.
- d) prepare and endorse design report of the earthworks with details including calculations and drawings.
- e) submit the above endorsed reports and drawings to Local Authority.
- f) be responsible for the supervision (e.g. to have resident engineer / inspector of works for full time supervision) of the works during construction.
- g) endorse the as-built drawings of earthworks prepared and endorsed by the licensed surveyor.

- h) endorse Form G1 under UBBL. Any changes shall be properly recorded and presented in the As-Built drawings.
- i) Engineer A shall submit all reports and drawings including clarifications of all technical aspect of the works (e.g. design and construction) to the Client. Engineer A shall also make available all these documents for engineer B upon request.
- j) Engineer A shall be responsible for all the works that he designed, endorsed and supervised by him.

2. Role and Responsibilities of Engineer B who is the Submitting Person for Buildings:

Engineer B shall:

- a) plan and supervise the Subsurface Investigation (S.I.) (e.g. boreholes, field and laboratory tests) to obtain the necessary parameters for analysis and design of the respective buildings.
- b) request for the endorsed design report and as-built drawings before proceeds with the design of the building structure, from the Developer or Engineer A, who is the Submitting Person for Infrastructure. Notwithstanding the above, Engineer B shall satisfy himself on the acceptance of the works handed over to him.
- c) carry out his own design investigation to ensure safety if he fails to obtain the necessary endorsed design report and drawings from Engineer A.
- d) be responsible for submitting Form G1 if there is no Submitting Person for Earthworks (no Engineer A).
- e) design the building foundation and structures to suit the platform handed to him to ensure both safety and serviceability of the building fulfilling the code of practice and good engineering practice.
- f) assess the geotechnical aspects of the platform/slopes/retaining structures to ensure it fulfils the safety and serviceability suitable for the proposed building (foundations and structures).
- g) carry out all necessary investigation and design to ensure the platform fulfils the requirements suitable for the building if he is not satisfied with the existing platform condition (e.g. earthworks, ground treatment, slopes, retaining walls, strengthening measures for slopes, etc.).
- h) carry out the necessary investigation and design if he wishes to change any slope profile or retaining wall retained height or loading. He shall be deemed to have taken over the responsibility of the works for the changes that he makes and those parts of the works affected by these changes. Engineer B shall also show clearly in the drawings all the changes made.
- i) submit his endorsed design and drawings for all his works (including the changes he made to the Local Authority and the client.
- j) be responsible for the supervision of the works during construction.

- k) design the building (foundation and structure) and certify on Form G3 and G4.
- l) assume full responsibility on the safety, stability and the serviceability of the buildings.

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BOARD OF ENGINEERS MALAYSIA

EXAMPLE OF GOOD ENGINEERING PRACTICE RELATED TO THIS GUIDELINES

Technical information for earthwork drawings

- i) Cut and Fill Plan.
- ii) Earthworks plan clearly showing the slopes (cut or fill), retaining walls types and layout, slope strengthening measures, etc.
- iii) For retaining walls and slopes strengthening works, the elevation views shall be presented.
- iv) Sufficient earthworks cross-sections (at spacing not more than 100m apart) to represent the actual site conditions. For sloping ground the cross-sections shall be perpendicular to the slope.
- v) Compaction requirements for engineered fill.
- vi) Thickness of Fill or Cut thickness.
- vii) Magnitude of settlement in short term and long term.
- viii) Ground treatment adopted (in drawings the types and technical details of ground treatment adopted, e.g. vertical drains, excavate and replace, surcharging)
- ix) Cut and fill slopes gradient, berm width and height.
- x) Drainage system (e.g. subsurface and surface drainage) and its discharge area
- xi) Details of retaining walls system used, loading designed for at the retained side the walls and the subsoil drainage for the wall.
- xii) The Factor of Safety used in the design of retaining walls, slopes, slopes strengthening, etc.

Key Information in Earthworks Design Report

- i) Clearly stating the Codes of Practice and Standards used.
- ii) The Subsurface Investigation (S.I.) information obtained including the borelogs in the format of earthworks cross-sections and compilation of all field results.
- iii) Present the soil / rock parameters obtained from the S.I.; and the values selected and used in the design of the earthworks (e.g. unit weight of soils, undrained and drained strength parameters, consolidation parameters, stiffness, permeability, etc.)
- iv) The ground water conditions.
- v) Design Criteria and Assumptions for the earthworks, ground treatment, slopes, retaining walls, etc. (e.g. loading used, Factor of Safety, etc.)
- vi) Design analyses results and calculations.
- vii) To highlight any ground issues related to loading, settlement and stability to the next Submitting Person taking over the platform.
- viii) To provide list of precautionary measures and maintenance manual to developer on maintenance of civil works so designed and constructed (especially when the building structure may only commence a few years later).