First Semester Examination
2021/2022 Academic Session

February/March 2022

EAG444 – Soil Stabilisation and Ground Improvement

Duration : 1 hour

Please ensure that this examination paper contains **FOUR (4)** printed pages before you begin the examination.

Instructions: This paper contains **TWO (2)** questions. Answer **ALL** questions.

All questions **MUST BE** answered on a new page.

1. (a). Discuss the initial **TWO (2)** steps taken in the event of a slope failure and give **ONE (1)** example of the cause and solution.

[4 marks]

(b). Discuss the difference between sinkholes and landslides in terms of how the phenomena occur.

[4 marks]

(c). Geosynthetics are materials used for many geotechnical project developments, and the products are part of the soil inclusions for ground improvement and soil stabilization.

(i). Explain **FOUR (4)** types of geosynthetics and their functions.

[4 marks]

(ii). Describe **TWO (2)** applications and elaborate the associated design criteria with the aid of sketches.

[8 marks]

2. The use of mechanically stabilised earth is proposed for a highway project's bridge abutment. **Figure 1** illustrates the design of a 10m tall mechanically stabilised earth. Backfill will be made of sand with a unit weight of 18 kN/m^3 and a friction angle of 33°. Reinforcement will be supplied by a 6 mm thick and 70 mm wide tie-back strips. The strips' allowable tension and interfacial angle are 2.5 x10^5 kN/m^2 and 10°, respectively.

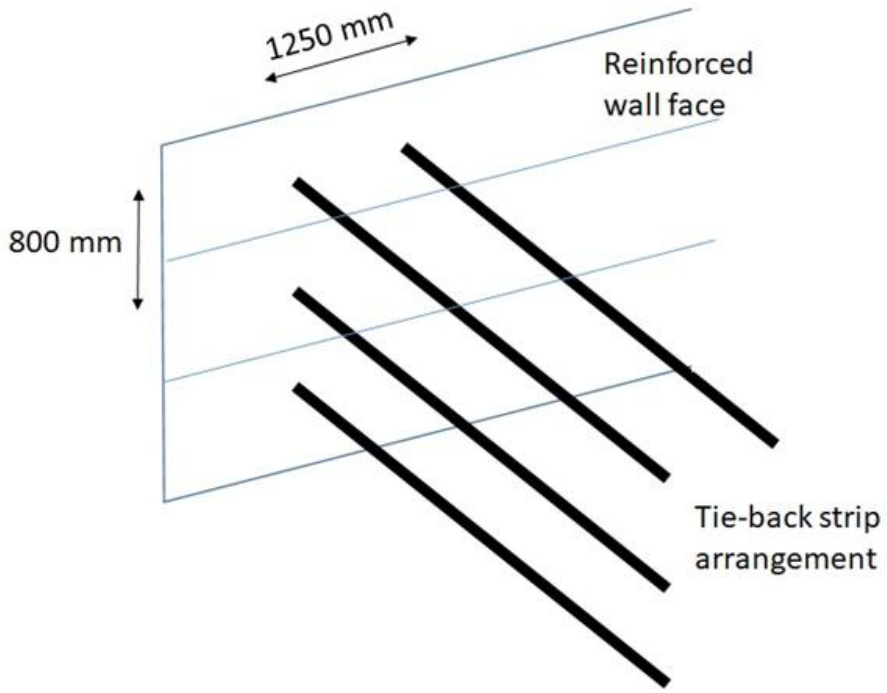

Figure 1

(a). If the required safety factor against tie breaking for the mechanically stabilised earth is 2.0, determine whether these tie-back strips are sufficient.

[6 marks]

(b). Due to a global shortage of metal strips of the appropriate grade, a new strip with an allowable tension of 1.9 x10^5 kN/m^2 is recommended. If the factor of safety against tie-breaking is reduced to 1.5, propose the minimum thickness of mechanically stabilised earth metal strip.

[7 marks]

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(c). Explain why, as metal strip corrosion increases, the factor of safety against tie-breaking decreases. Use a sketch to help your explanation.

[7 marks]

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