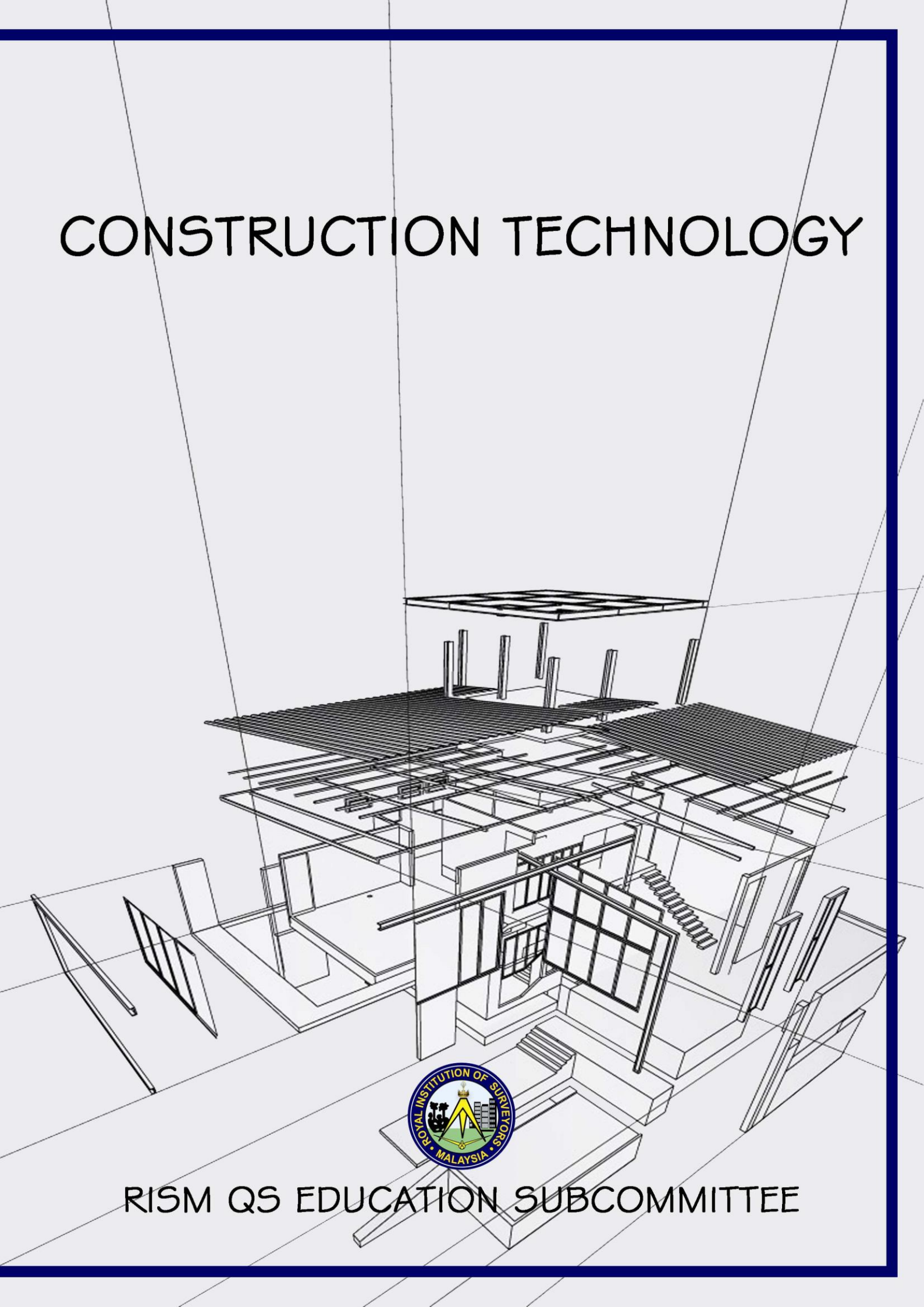
# CONSTRUCTION TECHNOLOGY



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# CONSTRUCTION TECHNOLOGY

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# PREFACE

The *Construction Technology* acts as a reference providing the basic tenets of construction under the Malaysian scene. It includes earthwork, sub-structure, and superstructure (floors, frame, stairs, roof, brickwall, doors and windows, finishes as well as plants and machineries). It is written with the conviction that brief explanations with ample illustrations and photographs to depict the real-life construction situations assist in linking the knowledge and practice apart from ease of understanding and comprehension.

The core concept of this reference revolves around providing supplementary lecture support material for construction students and lecturers. This reference underlines the rudimentary knowledge a student should acquire especially in their first year of any construction related qualification. Besides that, it also equips construction professionals or technologist with the necessary basic knowledge in relation to construction technology and activities, in enabling them to comprehend and take on discussions with related specialist. In making this refence well within reach to all readers, we have determined that it should be in the form of e-book. This is in line with the current digitalised construction industry and in support of sustainability.

**Ts. Sr Khoo Sui Lai, *CQS, FRISM***
**Editor**
**October 2021**

# ACKNOWLEDGEMENTS FROM RISM QS DIVISION EDUCATION SUBCOMMITTEE CHAIR

The Chair would like to express his thank to all the contributors that contributed to each chapter in this textbook. This is truly a collaborative effort across university, university college and polytechnic together with the RISM QS Division Education Subcommittee. To the co-editors: Dr. Felicia Yong Yan Yan, Dr. Lew Yoke Lian and Ts. Sr Dr. Nadzirah Hj. Zainordin, helped with reviewing and proofreading the book.

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**Ts. Sr Khoo Sui Lai, *CQS, FRISM***
**RISM QS Division Education Subcommittee Chair Session 2021/2022**
**October 2021**

# ACKNOWLEDGEMENTS FROM RISM QS DIVISION CHAIR

Today, new technologies in construction are being developed at a breakneck pace. What seemed like future technology from 10, 20 years ago like connected equipment and tools, telematics, mobile apps, autonomous heavy equipment, drones, robots, augmented and virtual reality, and 3D printed buildings are here and being deployed and used on jobsites across the world.

However, I believe in shaping the fundamental understanding toward construction technology process always a crucial process. As this textbook core concept as serve to be use as supplementary lecturer support material for lecturer and student in Built Environment, the fundamental knowledge can be further develop before speaking about an adopting in line with the technology.

Every construction site is different, presenting its own unique set of challenges and risks. This makes it difficult to streamline processes and increase productivity the way industries like manufacturing and retail have been able to do. Thus, this textbook may further equip not only student which they are also future construction professional with the essential knowledge relating to construction technology and activities involve particularly in Malaysia perspective.

With the content provide, I believe this can be beneficial to all from lecturer, student and include construction professional.

**Sr Nazir Bin Muhamad Nor, *PQS, MRISM***
**RISM QS Division Chair Session 2021/2022**
**October 2021**

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# TOPIC 1

# EARTHWORK

## INTRODUCTION

Earthwork is the essential process in construction projects which is carried out at the earlier stage of construction. Earthwork involves the process of preparing the building platform level as required in the construction drawing and excavation works. The completion of earthwork within the stipulated time is often the key to completing the entire project without delay. In other words, earthwork is an essential work component in a construction project. Any negligence in carrying out the earthwork will most likely lead to loss of time, cost, and loss of life. Hence, the use of plants and machinery is encouraged to reduce costs and speed up the work.

Earthwork is divided into two main activities, which are:

i. Site clearance - comprises all necessary site clearance and preparation activities such as removing trees, hedges, and clearing undergrowth.
ii. Excavation works - consists of various types of excavation, earthworks support, and disposal of groundwater.

## SITE CLEARANCE

Site clearance is the removal and disposal of unwanted material such as vegetation, dead stumps, surface boulder embedded in the ground, etc. These materials should not be left and buried at the site, as they will decay gradually and cause a decrease in ground-level settlement leading to building failure. The site clearance process is initiated after site