

research in the area of cable joints. The construction of cables and cable jointings are discussed.

Chapter three discusses about the research methodology, the selection of districts under study, sampling design, data collection procedure and data analysis techniques.

Chapter Four discusses about the result of the survey and summary statistics of the data.

Chapter five includes summary of the study and recommendations proposed. It will also discuss on further research needed to fully identify the causes of cable failures and measures of minimising it.

There are two categories of breakdown in distribution district, namely, high voltage breakdown (11- 33 kV) and low voltage breakdown (below 600 V). Normally high voltage system consists of a series of low voltage sub-systems. Thus the multiplying effect of customers connected to high voltage system.

Low voltage breakdown account for the bulk of it but the overall impacts to customers are low compared to high voltage breakdown. This impact is measured in term of number of customers affected, losses to customers and TNB, ease of repair and time taken to restore supply.

High Voltage breakdown can be categorise into five major areas, namely, cable joint failures, external causes, excavation by third party, intermittent faults and overloading. Causes for cable joint failures are difficult to analyse as the cable joints are exposed to external environment such as excavation, earth movement, loading and other external factors.

1.1 OBJECTIVES

This research proposes to identify the probable cause(s) of cable joint failures in TNB districts, their causes, impact on availability and profitability. Once the causes of failures are identified, alternatives are recommended to reduce the failure rate.

1.2 SCOPE OF THE RESEARCH

The scope of this research is to find the probable cause(s) of cable joint failures within TNB districts. The research will test for pattern in cable failure instances based on factors normally associated with cable joint failures.

1.3 FORESEEABLE PROBLEMS

There are concerns regarding this study in the area of secondary data. This data, being historical in nature cannot be collected by interviews.

The districts under study may not :

- have the full details of the breakdowns and their causes
- keep the breakdown records more than one year

The response from staff may not be positive, as they may think that this study makes them look bad.

1.4 ORGANISATION OF THE REPORT

Chapter one is about introduction on the basis of the study, objectives, scope and limitation. Chapter two includes literature review on cables, cable joints, factors affecting their failures, impact on availability of supply and profitability, and new

1.0 INTRODUCTION

The development in technology in recent years has made organisations to operate in higher productivity, reduces lead time, improve quality, respond to competition and meet customers needs. Electricity supply, one of the most important source of energy for development, should be stable, reliable, clean and always available.

Electricity cannot be stored as a product and hence the usage is instantaneous. Unavailability of electricity supply from the utility company means making equipment unoperational. An alternative supply, in a form of mobile generator, is very expensive.

Availability of electricity supply is vital and Tenaga Nasional Berhad (TNB) should explore all economical alternatives to ensure that electricity supply is always available. With the increase dependence on technology, interruption of electricity supply means a total halt to production activities. An example is an office that depends on computers for its operation, once supply is interrupted, activities will come to a halt as the information needed are not available.

One source of unavailability of electricity supply is breakdown.