the research to be conducted. The researcher interest is in the management of cable joint failures while TNRD is more on technical part of the problem. The researcher was then given the data to be analysed.

Data is collected through personal interviews and discussion with staff of IKATAN who performed the post-mortem for failed cable joints sent by various districts.

Failed cable joints have been sent for post-mortem at IKATAN. However, the results are not in hard evidence. The findings were discussed with the relevant partners and discussion of the actions to be taken to avoid repeated mistakes.

- Ground condition of the failed cable joint
- Identity of jointer performing the failed joint
- Probable cause of the cable joint failures

Sample of the form used is as in Appendix A.

3.1.2 Primary and Secondary Data - Post-mortem on Failed Cable Joints

IKATAN, in collaboration with districts and Engineering Department conduct post-mortems on failed cable joints. Personal interviews were conducted and series of discussions were held with the staff concerned.

3.2 SAMPLE DESIGN

The sample consists of breakdowns due to cable joint failures for January to August 1995 in 11 selected districts. All breakdowns due to cable joint failures which were recorded by the districts concerned are used for the study.

The selection of the districts under research is based on availability of data, location, and the size of the districts. Some of the districts selected did not have one or two months of data.

The location of districts selected are based on region, that are north, central, south and east. The other criterion for location is mainland and along coastal

areas.

The eleven districts are then categorised into three groups, namely 'big district', 'medium district' and 'small district'. The criterion for categorising is based on the number of customers connected to the district concerned. Three districts with more than 75,000 customers, four districts with customer base of between 25,000 to 74,999, and four districts with less than 25,000 customer base are selected. They are categorised as the 'big district', the 'medium district', and the 'small district' respectively.

3.3 DATA COLLECTION

The researcher seeks secondary data on breakdowns caused by cable joints, their symptoms and causes, standing procedures, instructions and work system from TNB district offices under research.

Discussion with Engineering Department staff concludes that it is very difficult to get data from districts. This has been envisage by the researcher earlier. The next best solution is to get what ever data available through Engineering Department and Tenaga Nasional Research and Development (TNRD).

The data gathered by the Engineering Department have been given to TNRD for further analysis. The researcher then met TNRD staff to discuss what is best for

3.0 RESEARCH METHODOLOGY

This research utilises historical data as its main thrust and personal interviews on analysis of post-mortem conducted on failed cable joints.

Historical data are used to establish occurrences of cable joint failures, history of the cable joints and the environment during cable jointing process. Post-mortem of failed cable joints gives an insight of the construction of the failed cable joints and the causes of the failure.

3.1 DATA

3.1.1 Secondary Data - Cable Joint Failures Report

Historical data used is the improvement of the previous collection for the whole of TNB districts done in 1995. Data gathered includes the following items:

- Date of failure
- Types of joint used
- Brand name of joint
- Date the joint was made
- Age of the cable joint
- Types of cables jointed
- Voltage level