



## CHAPTER III

### METHODOLOGY AND PROCEDURE

#### 3.1 Materials and Equipment

Software:

3.1.1 GAMS

3.1.2 SIMSCI(Pro II)

#### 3.2 Procedure in Application with Refinery

3.2.1 Pinch Analysis and Retrofit by Pinch Analysis

Pinch analysis was used to check the retrofit potential of base case refinery.

3.2.2 Grassroots Model Design for Heat Exchanger Network

The grassroots design of ARC heat exchanger network was run by GAMS in order to compare the construction and utility consumption between the existing network and the resulted network from grassroots model by GAMS software.

#### 3.3 Procedure in Study with Multiple Types of Crude

3.3.1 Simulation of Base Case Refinery

The structure of base case refinery was used to simulate and specify product properties. In this work, three types of crude oil was applied to simulate the heat exchanger network.

3.3.2 Grassroots Model Design Heat Exchanger Network

The grassroots model was used to find new heat exchanger network by using the stream data from simulation as parameter in GAMS software in order to matching hot and cold streams from simulation.

### 3.3.3 Validation of New Heat Exchanger Network by PROII Software

After got new heat exchanger network, it was validated again by PRO II software and kept the specification as in base case network.

### 3.3.4 Simulation of Network with Different Crude Oil Types

Heat Exchanger network was simulated to handle various crude types and study hot and cold utility.

### 3.3.5 Optimization by GAMS software

The utility consumption of each network was optimized by GAMS software in order to find the best heat exchanger network handling multiple types of crude oil in operation plan.