



President University

Internship Report for

# SIEMENS

PT . Siemens Pulomas Factory

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Electrical Engineering

002201400001

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# TABLE OF CONTENT

Table of Content .....	2
Preface .....	3
CHAPTER I – INTRODUCTION .....	4
I.1 Background .....	4
I.2 Objectives .....	4
I.3 Benefits .....	5
I.3.1 Benefits to the Company .....	5
I.3.2 Benefits to the University .....	5
I.3.3 Benefits to the Student .....	5
CHAPTER II – COMPANY PROFILE.....	6
II.1 Company History .....	7
II.2 Organizational Hierarchical .....	8
II.2.1 Project Manager.....	9
II.2.2 Test Engineer.....	9
II.2.3 Test Inspector.....	9
II 2.4 RTU Engineer.....	9
II 2.5 SAS Engineer.....	9
CHAPTER III – INTERNSHIP ACTIVITIES .....	9
III.1 Panel Hand Over.....	10
III.2 Panel Inspection.....	12
III.2.1 Visual Checking.....	13
III.2.2 Function Checking .....	14
III.2.3 Factory Acceptance Test.....	15
CHAPTER IV – PERSONAL RESULTS EVALUATION / POINTS LEARNED .....	16
IV.1 Worthwhile Internship .....	16
IV.2 Implemented Theory .....	16
IV.3 Comprehend the Industry .....	17
IV.4 Technical Knowledge, New Approach and Skills .....	17
IV.5 Personal Strenght and Weakness .....	17
CHAPTER V-RECOMMENDATION.....	18
V.1 Recommendation for PT Siemens Indonesia .....	18
V.2 Recommendation for President University .....	18
Appendices .....	19-24

## **Preface**

Praise and gratitude the author say to The Almighty God for his mercy and guidance I could finish this internship report.

Internship program is very important to all of the student in President University to complete the study in last semester. In the internship we know that we can and know how to work in the company as the employee and also we can get more training in the internship. The purpose of this report is one of the academic requirement that must be implemented for every student of Electrical Engineering study program in President University.

With the completion of this internship, the author would like to thank the lecture, on-site supervisors, workers and friend for helping guiding, teaching and sharing new knowledge and experiences.

In writing this report the author knows the shortcomings, therefore the authors expect criticism and constructive suggestions from all parties and also hope it will benefit us all. And I as an author hope will success in the future.

Anastasia Salsabila

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Electrical Engineering

# CHAPTER I

## INTRODUCTION

### I.1 Background

Internship is a program that conducted by President University as the one of requirement for graduation. It is a part of vocational training system that is integrated organized between training and directly working under the guidance and supervision of instructors or more experienced workers in a certain company, in order to master a particular skill or trade. Internship it can be media for student to know how work vibes, or it can like a medium to give the reality what student learned in the campus and implement to the real world it means to the work. In other words, through internship students explore the connections between academic ideas and practical knowledge. So, students are automatically can explore the industrial world and the expertise of working skills.

### I.2 Objective

The objectives of the internship program are:

- To give the experience to student how to be the employee in company and know how to work in the company.
- To develop skills and knowledge in the application of the theory to practical work situations.
- To enhance the student about the industrial word.
- To complete the student's education process in undergraduate program.

## **I.3 Benefits**

### **I.3.1 Benefit to the Company**

- It can establish a good relationship between the company and the campus.
- the company can improve its quality with the existence of internship program.
- Companies will be known in the world of education.

### **I.3.2 Benefit to the University**

- Get strong a good relationship between company and the campus.
- Help the campus to enlarge the place for the graduates into the world of work.
- Help the student undergraduate to improve the quality through the internship.

### **I.3.3 Benefit to the Student**

- To prepare the student before enter the real work.
- To help the student to get the connection into the company and can provides career awareness for the student.
- To give the experiences to the student how to be an employee in the company.

# **CHAPTER II**

## **COMPANY PROFILE**

### **II.1 Company History**

Siemens has played an impressive role in shaping the technological evolution of Germany, Europe and the whole world. Come join us on a trip through Siemens history. Here are nine chapters of our exciting, ever-changing evolution as a company. Explore the innovative technologies that made Siemens the company it is today. Get to know the people who made our history. Our country profiles show that Siemens has always been an international firm. The site is rounded out with current History News and an overview of our work at the Siemens Historical Institute.

Anyone who deals with Siemens history becomes a witness to exciting developments. This global pioneer in electrical engineering began as a simple start up. Today, 170 years later, the 10-man business that once operated at Schöneberger Strasse 19 in Berlin is a global giant that has served as a major innovation and technology force over the years. Come with us on a thrilling trip through time.

Pioneering technologies and the business models that were built on them have been the foundation of Siemens for 170 years. The company's innovations have stood out because they didn't stop with a mere invention; rather, they established a place for themselves in the market as new products, solutions and services. Siemens Indonesia is a global powerhouse company in electronics and electrical engineering, operating in the industrial, energy and health sectors. We develop and manufacture products, systems and solutions for industrial applications, power generation and distribution, road and rail transport, buildings, lighting and healthcare providers. Worldwide, Siemens and its subsidiaries employ 461,000 people in 190 countries.

PT. Siemens Pulomas Factory was established in October 1975 located at Jl. Jendral Ahmad Yani Kav. 67-68, Pulomas Jakarta Indonesia, Pulomas Factory is the oldest manufacturing facility of Siemens in Indonesia for the manufacturing, assembly wiring, testing, and maintenance workshop. The factory has now become Siemens

regional production hubs for Air-insulated Medium Voltage Systems, for up to 24 kV and for Low Voltage Systems serving the international and Indonesian Markets.

With 40 years of experiences PT. Siemens Pulomas Factory has conducted many projects for many companies in Indonesia and abroad. The projects comprise of PLN IBRD Project in Indonesia, Cement Tonasa V in Indonesia, DEWA in United Arab Emirates, PLN JProc in Indonesia, PLTU Paiton in Indonesia, Oil & Gas: Kepodang in Indonesia, Pulp & Paper: IKPP in Indonesia, Oil & Gas: Ras Laffan in Singapore, Oil & Gas: Conoco Philip in Indonesia, Cement Tuban IV in Indonesia, Ulumbu Geothermal Power Plant in Indonesia, PLTU Surabaya in Indonesia.

Until now Siemens keep doing many projects all around Indonesia and abroad to fulfill electrical needs by industries in all over the world. PT. Siemens Pulomas Factory has obtained several certifications, they comprise of ISO 9001, ISO 14001, OHSAS 18001, ISO 50001, SMK3, Proper.

## II.2 Organization Hierarchical





**Figure II.1 Diagram of Hierarchical at PT.Siemens Pulomas Factory EM DG SYS Department**



### **II.2.1 Project Manager**

The main function of Project Manager :

Responsible to lead all the activity which is all the employee,project taken by EM DG SYS Departement.

### **II.2.2 Test Engineer**

The main function of Test Engineer :

Responsible to handle the panel (protection, control, etc) specially to program a certain component inside the panel and handle the FAT (factory acceptent test) procedure.

### **II.2.3 Test Inspector**

Basically has the same responsible with Test Engineer which is to handle the panel and doing the handover process before the panel come into the workshop and filling some administration form.

### **II.2.4 RTU Engineer**

RTU (remote terminal unit) engineer is the engineer controller that control the microprocessor controlled electronic device that interface object in physical.

### **II.2.5 SAS Engineer**

SAS (Submission automation system) engineer is the engineer that control the system via monitor and build the system for all of the project that can control via monitor or interface to the costumer.

# CHAPTER III

## INTERNSHIP ACTIVITIES

### III.1 Panel Handover

Handover is the process of receiving panels from the third party before entering the workshop for further inspection. This is the first step in the factory to checking by quality control department. Handover is a form that contains the requirement for quality control checking, requires a certain form as evidence that the panel has been received.

**SIEMENS**  
Energy Management  
SINUS 2017-2018  
Hand Over Form

Project Name: KT GEDUNG BERSIH (GEDUNG)  
Project No.:  
Customer:  
Component:  
Area:  
Panel Type: REPERING PANEL  
Panel No.: 1001, 1002, 1003, 1004  
Panel Name: REPERING PANEL  
Date and Time: 25 FEB 2018

No.	Pemeriksaan / Checking	OK	Not OK	Catatan / Remark
1	Dokumentasi Quality Record ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2	Panel dalam keadaan bersih	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3	Panel dalam keadaan bersih pada bagian luar dan dalam	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4	Panel is clean for both exterior and interior	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5	Salah satu dari label terpasang	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6	Panel ground and not damaged	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7	Panel dalam keadaan bersih dan EDI ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8	Panel in clean condition and EDI are available	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
9	Salah satu dari label terpasang dan EDI ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
10	Salah satu dari label terpasang dan EDI ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
11	Salah satu dari label terpasang dan EDI ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
12	Salah satu dari label terpasang dan EDI ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13	Salah satu dari label terpasang dan EDI ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
14	Salah satu dari label terpasang dan EDI ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
15	Salah satu dari label terpasang dan EDI ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
16	Salah satu dari label terpasang dan EDI ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
17	Salah satu dari label terpasang dan EDI ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
18	Salah satu dari label terpasang dan EDI ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
19	Salah satu dari label terpasang dan EDI ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
20	Salah satu dari label terpasang dan EDI ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
21	Salah satu dari label terpasang dan EDI ada	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Handwritten notes at the bottom of the table:  
 1) 1001 - 1002 - 1003 - 1004  
 2) 1001 - 1002 - 1003 - 1004  
 3) 1001 - 1002 - 1003 - 1004  
 4) 1001 - 1002 - 1003 - 1004

Signature lines:  
 Diperiksa oleh / Inspected by: \_\_\_\_\_  
 Diterima oleh / Received by: \_\_\_\_\_

Form footer:  
 Nama: \_\_\_\_\_  
 Nama: \_\_\_\_\_  
 Pekerjaan: PT Siemens Indonesia  
 Company: PT Siemens Indonesia  
 Page 1 of 1

Picture 3.1 Hand Over Form

The Hand Over form which has to be fill when the panel come into the workshop or to the quality control room. The form above consist of information about the panel like the condition of the panel after the panel arrived, the documentation about the panel, component completeness in the panel, the wiring in the panel, and panel hand over status is there any complain or not. Each of this information will be marked with a value of OK, not OK , N/A. After the form is done to fill, we must fill the quality control check list that Hand Over already done and this form must be signed by the sender and the receiver in this case Test Engineer Leader. (picture 3.2)

**SIEMENS**  
PT Siemens Indonesia  
Energy Management  
Digital Grid Systems  
EM DC SYS - FAT, SAT & Quality Group

**Quality Control activity check list**

Project Name : G1 UBATU BARU (DELTA MAS)  
Substation Name :  
Panel No. : B04+R5  
Project Manager : SYARIEF  
Date and Day Panel Received : 25 September 2017  
Release date : 29/12/2016

No.	Description	Status	Name	Date	Short Signature
1.	Handover	OK	Anas	25/9/17	<i>[Signature]</i>
2.	Component check				
3.	Quality Visual Inspection				
4.	Function : megger				
5.	Function : inject				
6.	Function : control				
7.	Documentation before release				

**ATTENTION**  
 • THIS IDENTIFICATION NOTE MUST BE ATTACHED AT THE FIRST TIME AND TAKEN OUT AT THE LAST TIME BEFORE DELIVERY  
 • ORIGINAL CHECK LIST WITH GREEN COLOR PAPER.

**Picture 3.2 Quality Control Activity Check List**

## **III.2 Panel Inspection**

Panel inspection is the process of checking the panel after the Handover process. This is the main job of Quality Control department. The process of panel inspection divided into three process visual checking, function checking, and Factory Acceptance Test (FAT).

### **III.2.1 Visual Checking**

Visual checking is the checking with the specific document that match the type of panel. The document must complete information of a specific panel.

Visual checking is done by following procedure:

1. We must check every side front, side, inside, rear and above the panel and match it with the document from the engineering.
2. The panel must be checked detail and careful, because if there is some component do not available it means you must write in the NCR form.
3. The part that has been checked as a proof we must give the highlighting usually with the stabillo.
4. When finding a defect or something different from the document, a small sticker must be placed on a specific part of the panel for the example: there is the component not complete in some part, there is scratch at the body, wrong the word in the plat in the panel. Any actual design that does not match with the document need to be noted on a form called NCR (non-conformance finding in factory routine test) form with a blue coloured pen for the production and project management, and the red coloured is for engineering.
5. Testing the panel, measurement, parts replacement, and cleaning is to be a part of visual checking, and performed specifically to prevent faults from occurring.



3. Single Line Diagram (SLD)/Schematic Drawing: Describe electricity system in the panel, giving the information for every single component or equipment inside the panel.
4. Screw driver, Crimping Plier Tool kit, Wire: Basic tool need to do a certain modified, fixing, and component instalment.
5. Test lamp: Indicator for Receptacle function.
6. Megger : Checking resistance leak in the system
7. Test Block: Blocking the current flow.
8. Omicron: To inject the current and the voltage into the panel.
9. Laptop: To control the injection using Omicron, and the program in the computer.
10. Simulator: To simulate the panel into the actual condition in main substation or like in GARDU INDUK.

### III.2.3 Factory Acceptance Test

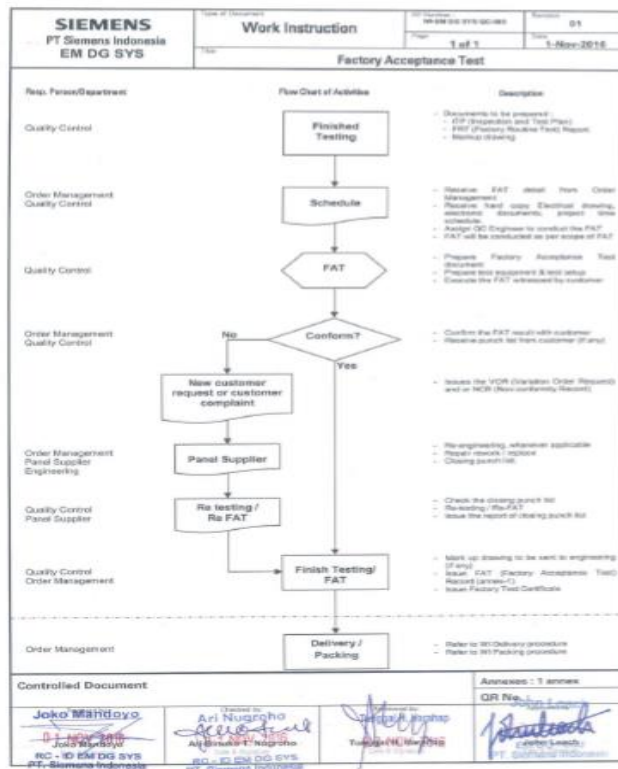
**Factory Acceptance Test (FAT)** is the final step of the panel inspection. This process is involved between costumer and quality control department member. Costumer usually from PLN with the contractor that they choose before the project. In the FAT the test engineer leader and the crew will show the result of their work into the costumer to proof that the panel is working properly and ready to be delivered.

SIEMENS		FAT REPORT FOR SUBSTATION AUTOMATION SYSTEM (SAS)		Page 1/3		
Project : 150/20kV GI Martapura						
Client :						
End User : PT. PLN (Persero)						
Location : Transformer 1						
Feeder No : E03+W1/R1						
Date :						
A. Control function test of HV Equipment						
A. 1. Control function CB & DS						
No	Description	RCP		HMI		Remarks
		Mimic	Bay Control Unit (A301)	Graphical Display	Event List	
1	Circuit Breaker (CBQ0)	Open				
		Close				
2	Disconnecting Switch (DSQ1)	Open				
		Close				
3	Disconnecting Switch (DSQ2)	Open				
		Close				
B. Signaling and Function test						
B.1. Signaling and Function test of HV Equipment Status						
			Bay Control		HMI	

**Picture 3.4 One of form for FAT for project GI MARTAPURA**

Factory Acceptance Test: Relay Control Panel (RCP)										
PT Siemens Indonesia, Energy Management Product Management Energy Relational Quality Control Group										
Test Standard: compliance with IEC 61439-1 & IEC 61439-2 Low Voltage switchgear and controlgear										
Project No.	Customer/Client	Project Name	Panel Name	Panel No.						
579873	PT INDOKOMAS BUANA PERKASA/PT PLH (PERSERO)	15BLV GIMARTAPURA	15B/28 LV Transformer Protection Panel	-E85A/1						
Individual Function Test: Motoring Test Card for BCU/IEDr										
Order Code	Serial No.						Date of Test			
579873	5011785885441						14/14/2017 21:34			
Firmware	Resonance		Trial Equip.		Trial Dg					
57.34	< 8.5X Err		CM35K (EE62EK)		RIKY					
CT Ratio:	300 A	5 A	VT Ratio:	150 LV	100 V					
Secondary Injection:	Voltage Output:	57.735 V	Freq:	50 Hz	Current Output:	1.88 A				
	Voltage Reg:	0.8 (balance)			Current Reg:	30.8 (balance)				
A. Current Measurement										
X Load	Current Inj.	Calculated Value	Phase R	Phase S	Phase T	Pk.R	Pk.S	Pk.T	Haris	
50X	1.58 A	158.88 A	149.88 A	149.88 A	149.88 A	-1.87	-1.83	-1.73		
100X	1.88 A	188.88 A	209.78 A	209.54 A	209.76 A	-1.87	-1.42	-1.88		
150X	1.18 A	118.88 A	209.75 A	209.88 A	209.76 A	-1.88	-1.18	-1.87		
B. Voltage Measurement (Pk-Gnd)										
X Load	Volt. Inj.	Calculated Value	Phase R-S	Phase S-T	Phase T-R	Pk.R	Pk.S	Pk.T	Haris	
50X	28.858 V	43.2819 LV	43.28 LV	43.28 LV	43.28 LV	-1.18	-1.42	-1.18		
100X	57.735 V	86.5638 LV	86.58 LV	86.58 LV	86.58 LV	-1.42	-1.42	-1.42		
150X	86.585 V	129.8457 LV	86.58 LV	86.58 LV	86.58 LV	-1.42	-1.42	-1.42		
C. Voltage Measurement (Pk-Pk)										
X Load	Volt. Inj.	Calculated Value	Phase R-S	Phase S-T	Phase T-R	Pk.R	Pk.S	Pk.T	Haris	
50X	28.858 V	75.88 LV	74.92 LV	74.92 LV	74.92 LV	-1.11	-1.42	-1.11		
100X	57.735 V	151.76 LV	149.82 LV	149.82 LV	149.82 LV	-1.42	-1.42	-1.42		
150X	86.585 V	227.64 LV	149.82 LV	149.82 LV	149.82 LV	-1.42	-1.42	-1.42		
D. Power Measurement										
X Load	Current Inj.	Volt. Inj.	Calc. MW	Calc. MVAR	Meas. MW	Meas. MVAR	MW	MVAR	Haris	
50X	1.58 A	57.735 V	33.75 MW	15.43 MVAR	33.72 MW	33.37 MVAR	-0.88	-0.11		
100X	1.88 A	57.735 V	57.58 MW	38.37 MVAR	57.44 MW	58.74 MVAR	-0.83	-0.53		
150X	1.18 A	57.735 V	74.25 MW	42.87 MVAR	74.43 MW	42.52 MVAR	-0.88	-0.58		
General Check (for BCU/IEDr)										
<input checked="" type="checkbox"/> Function Key OK <input checked="" type="checkbox"/> LCD Display OK <input checked="" type="checkbox"/> LED Indication OK <input checked="" type="checkbox"/> Display Input OK <input checked="" type="checkbox"/> BCU/IEDr Health Condition										
FAT RCP Rev.1 - EM EA PM QC										

Picture 3.5 FAT form for metering in BCU



Picture 3.6 Flow the FAT

# **CHAPTER IV**

## **PERSONAL RESULT / EVALUATION /POINTS LEARNED**

### **IV.1 Worthwhile Internship**

The internship is very helpful and valuable. The internship program at PT. Siemens Pulomas plant has thought the author about the introduction of a professional environment and provides a wealth of new knowledge to the author about working at the Manufacturing Facility.

### **IV.2 Implemented Theory**

The theory from the class that author implementation in the workplace not too much, the author must learned a little bit about the theory in the workplace .

### **IV.3 Comprehend the Industry**

Internship at PT. Siemens Pulomas Factory gives the author knowledge and the experiences how to make the panel from the beginning until done to the costumers. And gives the flow process receiving, working, checking and realising the product.

### **IV.4 Technical Knowledge, New Approach Skills**

The internship gives the author the knowledge of electrical practice in dealing with both high powered component and low powered component. And gives the knowledge how to connect to power supply with 3 phase and 2 phase. Measuring the voltage, current, BCU, relay, lockout relay, test block, switch, MCB, etc. give the knowledge how to inject the current and voltage to the component in the panel like BCU, TAPCON etc. with OMICRON injected. Teach the author to solve the troubleshooting in the panel when the quality control checking. The troubleshooting like finding error inside the panel and fixing several wiring error and component error caused by missing several wiring error and component error caused by misallocation of wire, visual checking such as finding defects both inside and outside the panel. The working environment is quite good and makes the author to work efficiently and precisely.



#### **IV.5 Personal Strength and Weakness**

The internship proved useful that it reveals the author's personal strength and weakness. The strength and weakness clearly shown when doing the practice with fellow staffs in the intern company, when we work together we can see what is the strength and weakness of author. The author learn how to be like another workers to know the strength and weakness.

#### **IV.6 Personal Growth**

The internship gives the author opportunity to have work experience in the factory while at the same time learn something that did not occur in classes. Due to this, the author obtain useful knowledge that campus never taught.

#### **IV.7 Future Career Plan**

The author future career plan after doing the internship at PT. Siemens is to obtain deeper knowledge on the product by Siemens especially in high voltage panel control and protection panel. Having a good skill in the future when the author already graduated and developing new skill and creating the new connection with another network. This internship experience give author a chance to work in the related field with the author background and because of that the author hope he can get many more experience furthermore.

# **CHAPTER V**

## **RECOMMENDATION**

### **V.1 Recommendation for PT. Siemens Pulomas Factory**

PT. Siemens Pulomas Factory has offered good overview and internship opportunity that is very educative and essential in work training. Internship in PT. Siemens Pulomas Factory, the author can gaining the knowledge and new skill related to the power electrical practice. The author suggest to the company to be more schedule for the internship program from the division of task to the trainer so that the trainer can work efficiently in the office. Another suggest to the company to the employee can brief the information about the component and another in the panel properly and explain the new method to troubleshoot the component. Overall PT.Siemens Pulomas Factory is a good company, gives the author a valuable knowledge and improve the author soft skills that in the campus can't get it and it is very useful to the future.

### **V.2 Recommendation for President University**

The internship program was a good program in campus. This program can make the starter to the student for the future in the work experiences before the graduating. As one of the student, the author also grateful for the chance of internship provided by the university. The author suggest to the campus that the internship program must still be held in campus. The campus also must have a good to many company not only in Cikarang or around Cikarang but in around Indonesia or maybe around the world. Overall the author very agreed if the internship program still in the one of semester in the academic.

# APPENDICES



