

AUTOMATIC BOOK BINDING MACHINE

ANIS ZAFIRAH BINTI ADNAN

UNIVERSITI MALAYSIA PAHANG

BORANG PENGESAHAN STATUS TESIS

JUDUL **AUTOMATIC BOOK BINDINGH MACHINE**

SESI PENGAJIAN: 2007/2008

Saya **ANIS ZAFIRAH BINTI ADNAN (851017-02-5630)**
(HURUF BESAR)

mengaku membenarkan tesis (PSM/Sarjana/Doktor Falsafah)* ini disimpan di Perpustakaan Kolej Universiti Kejuruteraan dan Teknologi Malaysia dengan syarat-syarat kegunaan seperti berikut:

1. Tesis adalah hakmilik Kolej Universiti Kejuruteraan dan Teknologi Malaysia.
2. Perpustakaan Kolej Universiti Kejuruteraan dan Teknologi Malaysia dibenarkan membuat salinan untuk tujuan pengajian sahaja.
3. Perpustakaan dibenarkan membuat salinan tesis ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. **Sila tandakan (✓)

SULIT (Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)

TERHAD (Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)

TIDAK TERHAD

Disahkan oleh

(TANDATANGAN PENULIS)

(TANDATANGAN PENYELIA)

Alamat Tetap:
**103, TAMAN ORKID, FASA 4
08000 SUNGAI PETANI,
KEDAH DARUL AMAN**

NORMANIHA BINTI ABDUL GHANI
Nama Penyelia

Tarikh: 19NOVEMBER 2007

Tarikh: 19 NOVEMBER 2007

CATATAN:

- * Potong yang tidak berkenaan.
- ** Jika tesis ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa/organisasi berkenaan dengan menyatakan sekali sebab dan tempoh tesis ini perlu dikelaskan sebagai SULIT atau TERHAD.
- ◆ Tesis dimaksudkan sebagai tesis bagi Ijazah Doktor Falsafah dan Sarjana secara penyelidikan, atau disertai bagi pengajian secara kerja kursus dan penyelidikan, atau Laporan Projek Sarjans Muda (PSM).

“I hereby acknowledge that the scope and quality of this thesis is qualified for the award of the Bachelor Degree of Electrical Engineering (Hons.) (Electronics)”

Signature : _____

Name : NOR MANIHA BINTI ABDUL GHANI

Date : 19 NOVEMBER 2007

AUTOMATIC BOOK BINDING MACHINE

ANIS ZAFIRAH BINTI ADNAN

This thesis is submitted as partial fulfillment of the requirements for the award of the
Bachelor of Electrical Engineering (Hons.) (Electronics)

Faculty of Electrical & Electronics Engineering
Universiti Malaysia Pahang

NOVEMBER, 2007

“All the trademark and copyrights use herein are property of their respective owner. References of information from other sources are quoted accordingly; otherwise the information presented in this report is solely work of the author.”

Signature : _____

Author : ANIS ZAFIRAH BINTI ADNAN

Date : 14 NOVEMBER 2007

DEDICATION

To my beloved mother

Pn. Nor Maniha binti Abdul Ghani

En. Mohd Azlan bin Sayuti

ACKNOWLEDGEMENT

First of all I am grateful to ALLAH S.W.T for blessing me in finishing my final year project (PSM) with success in achieving my objectives to complete this project.

Secondly I want to thank my family for giving morale support and encouragement in completing my project and also throughout my study in UMP as they are my inspiration to success. I also would like to thank my supervisor Pn Nor Maniha binti Abdul Ghani and Mr Mohd Azlan bin Sayuti for guiding and supervising my final year project throughout this two semester. They have been very helpful to me in finishing my project and I appreciate every advice that they gave me in correcting my mistakes. I apologize to both of my supervisor for any mistakes and things that I done wrong while doing my project.

Last but not lest I want to thank all my friends that have gave me advice and encouragement in completing my project. Thank you very much to all and May ALLAH bless you.

ABSTRACT

This thesis describe about the automatic book binding machine. This machine is using the hydraulic system, where the punching process and binding process use hydraulic cylinder. This automatic book binding machine is use a 'puncher' concept, and then compiles all the paper to bind. It can operate in two conditions which is manual and automatic. In manual system, it just use direct wiring, while in auto system, it will be controlled by PLC. The programming in PLC are using ladder diagram. In hydraulic system, the motor that will be used is 3 phase motor where is 3hp. The operation start with, the book will be placed in one basement book and the cylinder 1 will retract and punching process will happened. Then the motor will move the basement book to binding stage and the process will continue. To make the operation become smoothly, it used inductive sensor to detect every station to stop. This machine is using less human energy in binding book. The consumer only just push the button to make this machine functioning

ABSTRAK

Tesis ini menerangkan tentang mesin menjilid buku secara automatik. Mesin ini menggunakan sistem hidrolik, di mana proses menebuk lubang dan menjilid buku dilakukan oleh silinder. Mesin ini juga sebenarnya menggunakan konsep 'puncher', tetapi 'puncher' hanya boleh menebuk beberapa kertas sahaja dan kita terpaksa mengumpul semua kertas yang telah ditebuk untuk dibukukan. Manakala dengan mesin menjilid buku ini, kita dapat menebuk dan menjilid buku itu dengan terus dan mesin ini juga dapat menebuk dan menjilid buku-buku yang tebal. Pada amnya, mesin ini dapat beroperasi di dalam dua situasi, iaitu secara manual dan auto. Di dalam sistem manual, ia hanya menggunakan pendawaian secara terus manakala sistem auto di kawal oleh PLC dan segala process berlaku secara sendiri. Program PLC ini menggunakan gambarajah tangga. Motor yang digunakan didalam hidrolik sistem ini adalah jenis 3 fasa yang mempunyai 3 kuasa kuda. Mesin ini beroperasi dengan meletakkan kertas-kertas yang akan dibukukan di tempatnya dan silinder 1 akan membawa buku tersebut ke bahagian menebuk lubang dan operasi menebuk lubang dilakukan oleh silinder 2. Selepas itu, motor akan membawa buku tersebut ke bahagian menjilid buku dan proses menjilid buku dilakukan oleh silinder 3. Walaupun PLC digunakan untuk mengawal sistem, pengesan besi juga digunakan supaya dapat melancarkan lagi perjalanan proses sistem ini. Pengesan besi ini digunakan untuk mengesan besi apabila buku itu sampai dari satu stesen ke satu stesen dan berhenti bagi melakukan proses penjilidan. Dengan terhasilnya mesin menjilid buku secara automatik ini, penggunaan tenaga manusia dalam menjilid buku dapat dikurangkan. Mereka hanya perlu menekan suis bagi mengerakkan mesin ini.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	TITLE	i
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGEMENT	iv
	ABSTRACT	v
	ABSTRAK	vi
	TABLE OF CONTENTS	vii
	LIST OF FIGURES	x
	LIST OF TABLE	xi
	LIST OF ABBREVIATIONS	xii
	LIST OF APPENDICES	xiii
CHAPTER 1	INTRODUCTION	
	1.1 Overview of Book Binding Machine	1
	1.2 Project Objectives	2
	1.3 Project Scope	2
	1.4 Thesis Outline	3

CHAPTER 2 LITERATURE REVIEW

2.1	Programmable Logic Controllers (PLC)	4
2.2	Hydraulic System	6
2.3	Inductive Sensor	9

CHAPTER 3 METHODOLOGY

3.1	Introduction	10
3.1.1	Literature Review	12
3.1.2	Theoretical Design	12
3.1.3	Hardware Development	12
3.1.4	Circuit Design	13
3.1.5	Software Development	13

CHAPTER 4 RESULTS AND DISCUSSIONS

4.1	Introduction	14
4.1.1	Book Basement	16
4.1.2	Hydraulic Tank Base	17
4.1.3	Hydraulic Cylinder Stand	18
4.2	System Design	19
4.3	Hydraulic System	20
4.3.1	Hydraulic Pumps	20
4.3.2	Induction Motor	21
4.3.3	Hydraulic Cylinder	22
4.3.4	Hydraulic Valve	23
4.3.5	Pressure Gauge	24
4.3.6	Oil-air Cooler	25
4.3.7	Hydraulic Tank	26

4.4	Circuit Design	27
4.5	Software Design	32
CHAPTER 5 CONCLUSIONS AND RECOMMENDATION		
5.1	Conclusion	38
5.2	Project Recommendation	39
	5.2.1 Costing and Commercialization	39
REFERENCES		41
Appendices A – C		42-58

LIST OF FIGURE

FIGURE NO	TITLE	PAGE
2.2.1	Single Acting Cylinder	7
2.2.2	Double acting cylinder	7
3.1	Flowchart of Methodology	11
4.1	Automatic Book Binding Machine	15
4.1.1	Book Basement	16
4.1.2	Hydraulic Tank Basement	
4.1.3	Hydraulic Cylinder Stand	23
4.2	Switch Panel	25
4.3.1	Vane Variable Pump	27
4.3.2	Induction Motor	29
4.3.3	Double Acting Hydraulic Cylinder	30
4.3.4	Hydraulic Valve	31
4.3.5	Pressure Gauge	32
4.3.6	Oil-air Cooler	33
4.4.1	Direct on Line circuit	28
4.4.2	Electro Hydraulic Circuit	30
4.4.3	Motor Forward Reverse Circuit	31
4.5.1	Flowchart PLC 1	33
4.5.2	Flowchart PLC 2	34
4.5.3	PLC Wiring Diagram	35

LIST OF TABLE

TABLE NO	TITLE	PAGE
5.2.1	Costing Project	39

LIST OF ABBREVIATION

PLC	Programmable Logic Control
ELCB	Earth Leakage Circuit Breaker
MCB	Miniature Circuit Breaker
MC	Magnetic Contactor
O/L	Overload
DOL	Direct On Line
DC	Direct Current
AC	Alternating Current

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
A	Small-Capacity Analog Transistor Inverter	42
B	Data Sheet Three Phase 380V-400V	49
C	Working Process and Equipment	51