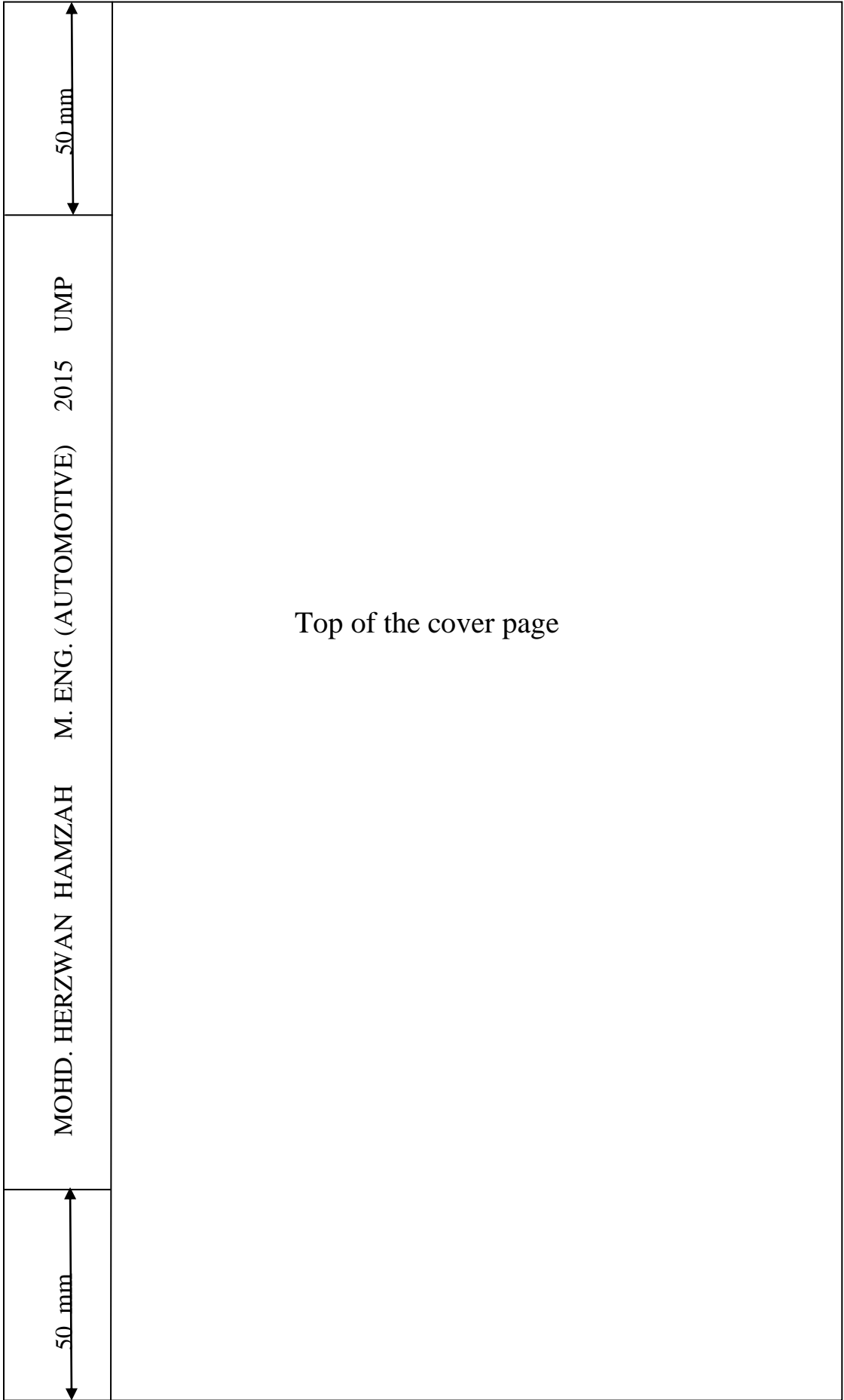


AN EXPERIMENTAL STUDY ON
PERFORMANCE OF DIESEL ENGINE
OPERATING WITH WASTE TIRE
AND WASTE PLASTIC DERIVED FUEL

MOHD. HERZWAN BIN HAMZAH

MASTER OF AUTOMOTIVE ENGINEERING
UNIVERSITI MALAYSIA PAHANG



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AN EXPERIMENTAL STUDY ON PERFORMANCE OF DIESEL ENGINE
OPERATING WITH WASTE TIRE AND WASTE PLASTIC DERIVED FUEL

MOHD. HERZWAN BIN HAMZAH

Thesis submitted in fulfilment of the requirements
for the award of the degree of
Master of Engineering in Automotive Engineering

Faculty of Mechanical Engineering
UNIVERSITI MALAYSIA PAHANG

APRIL 2015

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TABLE OF CONTENTS

	Page
SUPERVISOR'S DECLARATION	iv
CO-SUPERVISOR'S DECLARATION	v
STUDENT'S DECLARATION	vi
ACKNOWLEDGEMENTS	viii
ABSTRACT	ix
ABSTRAK	x
TABLE OF CONTENTS	xi
LIST OF TABLES	xvi
LIST OF FIGURES	xvii
LIST OF ABBREVIATIONS	xviii
LIST OF SYMBOLS	xix
CHAPTER 1 INTRODUCTION	1
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Objectives of Study	3
1.4 Scopes of Study	3
1.5 Flow Chart	4
1.6 Hypothesis	5
CHAPTER 2 LITERATURE REVIEW	5
2.1 Diesel Engine	6
2.1.1 History of Diesel Engine	6
2.1.2 Working Principle of Diesel Engine	7
2.1.3 Classification of Diesel Engine	11
2.1.4 Diesel Engine Applications	15
2.2 TDF as Alternative Fuel for Diesel Engine	16
2.2.1 Production of TDF	16
2.2.2 TDF as Alternative Fuel	17
2.2.3 Improvement of TDF for Diesel Engine Usage	18

2.3	PDF as Alternative Fuel for Diesel Engine	20
2.3.1	Production of PDF	20
2.3.2	PDF as Alternative Fuel	21
2.4	Fuel Properties	22
2.4.1	Cetane Number	22
2.4.2	Fuel Density	23
2.4.3	Viscosity	24
2.4.4	Calorific Value	24
2.4.5	Sulphur Content	25
2.4.6	Flash Point	26
2.5	Engine Performance Analysis	27
2.5.1	Engine Torque and Power	27
2.5.2	Ignition Delay	29
2.5.3	Peak Pressure	30
2.6	Diesel Engine Emissions	31
2.6.1	Exhaust Gas Temperature	31
2.6.2	Carbon Oxides (CO _x)	32
2.6.3	Nitrogen Oxides (NO _x)	33
2.7	Fuel Spray Characteristics	35
CHAPTER 3 METHODOLOGY		37
3.1	Introduction	37
3.2	Diesel Engine Test Rig Design	38
3.2.1	Diesel Engine	39
3.2.2	Engine Stand Design	40
3.2.3	Dynamometer	41
3.2.4	External Fuel Tank	42
3.2.5	Dynamometer Bracket	43
3.2.6	Air Volume Measurement	43
3.3	Test Rig Fabrication	45
3.3.1	Engine Stand Fabrication	45
3.3.2	Dynamometer System	46
3.3.3	External Fuel Tank	51
3.3.4	Air Volume Measurement System	52
3.3.5	Diesel Engine Modifications	53
3.3.6	Data Acquisition (DAQ) System Setup	55

3.3.7	Thermocouples	61
3.4	Exhaust Gas Measurement	63
3.5	Test Fuels and Sample Preparations	65
3.6	Fuel Properties Testing	67
3.6.1	Fuel Density	67
3.6.2	Kinematic Viscosity	68
3.6.3	Flash Point	69
3.6.4	Gross Calorific Value	69
3.7	Engine Test Operating Conditions and Procedure	71
3.8	Pre-Testing	72
3.9	Summary	72
CHAPTER 4 RESULTS AND DISCUSSIONS		73
4.1	Introduction	73
4.2	TDF Fuel Blends Properties and Characteristics	74
4.2.1	Fuel Density	74
4.2.2	Kinematic Viscosity	75
4.2.3	Flash Point	76
4.2.4	Gross Calorific Value	77
4.3	PDF Fuel Properties	78
4.3.1	Fuel Density	79
4.3.2	Kinematic Viscosity	80
4.3.3	Flash Point	81
4.3.4	Gross Calorific Value	82
4.3.5	Sulphur Content	82
4.4	Engine Performance when TDF is used as Fuel	83
4.4.1	Engine Torque	83
4.4.2	Engine Power	84
4.5	Combustion Characteristics of TDF	86
4.5.1	Cylinder Pressure at 1200 rpm	86
4.5.2	Cylinder Pressure at 1800 rpm	89
4.5.3	Cylinder Pressure at 2100 rpm	92
4.6	Backfire Phenomenon	95
4.7	Exhaust Gas Emissions of TDF	96
4.7.1	Exhaust Gas Temperature	96
4.7.2	Carbon Monoxide (CO) Emission	97
4.7.3	Carbon Dioxide (CO ₂) Emission	99
4.7.4	Nitrogen Monoxide (NO) Emission	100

4.7.5	Nitrogen Oxides (NO _x) Emission	101
4.8	Engine Performance when PDF is used as Fuel	103
4.8.1	Engine Torque	103
4.8.2	Engine Power	104
4.9	Combustion Characteristics of PDF	105
4.9.1	Cylinder Pressure at 1200 rpm	105
4.9.2	Cylinder Pressure at 1800 rpm	108
4.9.3	Cylinder Pressure at 2100 rpm	111
4.10	Exhaust Gas Emission of PDF	115
4.10.1	Exhaust Gas Temperature	115
4.10.2	Carbon Monoxide (CO) Emission	116
4.10.3	Carbon Dioxide (CO ₂) Emission	117
4.10.4	Nitrogen Monoxide (NO) Emission	118
4.10.5	Nitrogen Oxides (NO _x) Emission	119
CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS		120
5.1	Introduction	120
5.2	Conclusion	120
5.3	Recommendations	121
5.3.1	Validating experimental results using simulation software	121
5.3.2	Spray pattern analysis	122
5.3.3	Use distillate TDF instead of crude TDF as test fuel	122
REFERENCES		123
APPENDICES		128
1	Diesel Engine Specifications	128
2	YANMAR TF120M Technical Drawing	129
3	Hydraulic Specifications for Gear Pump	130
4	4a Dynamometer Bracket Drawing (Front Bracket)	131
	4b Dynamometer Bracket Drawing (Rear Bracket)	132
	4c Dynamometer Bracket Drawing (Base)	133
	4d Dynamometer Bracket Drawing (Torque Arm)	134
	4e Dynamometer Bracket Drawing (Upper Holder)	135
5	NBK Flexible Coupling Specifications	136
6	Custom Pulley Drawing	137
7	S Type Load Cell Specifications	138
8	Calibration Chart of Load Cell	139

9	Manometer Specifications	140
10	Technical Drawing of Trigger Wheel	141
11	KANE Gas Analyzer Auto 5-3 Specifications	142
12	Engine Stand Drawing	143
13	PETRONAS Dynamic Diesel Chemical Properties	144
14	YANMAR TF120M Standard Performance Curve	145
15	Gantt Chart	146
	LIST OF PUBLICATIONS	147

LIST OF TABLES

Table No	Title	Page
4.1	Properties of test fuels	74
4.2	Fuel properties of Diesel, TDF and PDF	79

LIST OF FIGURES

Figure No	Title	Page
2.1	Rudolf Diesel's successful engine prototype	6
2.2	Air-standard Diesel cycle	8
2.3	Air-standard Dual cycle	9
2.4	Four stroke compression ignition cycle	11
2.5	Two stroke diesel engine	12
2.6	Differences between direct and indirect injection	14
2.7	Pyrolysis process flow diagram	16
2.8	Conversion process of waste plastics to liquid fuel	20
3.1	Categories of alternative fuels	37
3.2	Test rig schematic diagram	38
3.3	YANMAR TF120M diesel engine	40
3.4	Proposed engine stand	40
3.5	Hydraulic gear pump	41
3.6	External fuel tank diagram	42
3.7	Dynamometer bracket design	43
3.8	Air volume measurement diagram	44
3.9	Engine stand	45
3.10	Solid rubber mountings	46
3.11	Hydraulic dynamometer bracket	46
3.12	Dynamometer control unit	47
3.13	Hydraulic oil reservoir tank	48
3.14	Hydraulic oil cooling radiator	48
3.15	High pressure hose	49
3.16	Flexible flanged shaft coupling	50
3.17	Custom flywheel pulley	50
3.18	S type load cell	51
3.19	External fuel tank	52
3.20	Air volume measurement system	52
3.21	The 23.1 mm diameter orifice	53

3.22	Manometer	53
3.23	Diesel engine without original fuel tank	54
3.24	Engine fuel pump	54
3.25	Modified exhaust manifold	55
3.26	DAQ system	56
3.27	Modification diagram of engine head	56
3.28	Cylinder pressure sensor	57
3.29	Cylinder pressure sensor at the top of engine head	57
3.30	Custom cylinder pressure sensor adaptor (cross sectional diagram)	57
3.31	Sensor area in the combustion chamber	58
3.32	Magnetic type crank angle sensor	58
3.33	Crank angle sensor position	59
3.34	Trigger wheel	59
3.35	Trigger wheel at the engine flywheel	60
3.36	DAQ system assembly	60
3.37	Engine speed sensor	61
3.38	Digital tachometer	61
3.39	Modified intake manifold	62
3.40	Drilled exhaust manifold	62
3.41	Thermocouple placement for ambient temperature measuring	63
3.42	Multipoint temperature indicator	63
3.43	KANE exhaust gas analyzer	64
3.44	Completed engine test rig (front view)	64
3.45	Completed test rig (side view)	65
3.46	Mechanical mixer	66
3.47	Density meter	67
3.48	Viscometer	68
3.49	Flash point tester	69
3.50	Fuse wire attach to the coil	70

3.51	Bomb calorimeter	70
3.52	Software interface sample	72
4.1	Density of test fuels	75
4.2	Kinematic viscosity of test fuels	76
4.3	Flash point of test fuels	77
4.4	Gross calorific value of test fuels	78
4.5	Fuel density	79
4.6	Kinematic viscosity	80
4.7	Flash point	81
4.8	Gross calorific value	82
4.9	Sulphur content	83
4.10	Engine torque for all test fuel	84
4.11	Engine power for all test fuel	85
4.12	Cylinder pressure at 1200 rpm	86
4.13	Ignition delay at 1200 rpm	87
4.14	Peak pressure at 1200 rpm	88
4.15	Cylinder Pressure at 1800 rpm	89
4.16	Ignition delay at 1800 rpm	90
4.17	Peak pressure at 1800 rpm	91
4.18	Cylinder pressure at 2100 rpm	93
4.19	Ignition delay at 2100 rpm	94
4.20	Peak pressure at 2100 rpm	95
4.21	Backfire phenomenon	96
4.22	Exhaust gas temperature	97
4.23	Carbon monoxide (CO) emission	98
4.24	Carbon dioxide (CO ₂) emission	99
4.25	Nitrogen monoxide (NO) emission	100
4.26	Nitrogen oxides (NO _x) emission	102
4.27	Engine torque	103
4.28	Engine power	104
4.29	Cylinder pressure at 1200 rpm	105

4.30	Ignition delay at 1200 rpm	106
4.31	Peak pressure at 1200 rpm	108
4.32	Cylinder pressure at 1800 rpm	109
4.33	Ignition delay at 1800 rpm	110
4.34	Peak pressure at 1800 rpm	111
4.35	Cylinder pressure at 2100 rpm	112
4.36	Ignition delay at 2100 rpm	113
4.37	Peak pressure at 2100 rpm	114
4.38	Exhaust gas temperature	115
4.39	Carbon monoxide (CO) emission	116
4.40	Carbon dioxide (CO ₂) emission	117
4.41	Nitrogen monoxide (NO) emission	118
4.42	Nitrogen oxides (NO _x) emission	119

LIST OF ABBREVIATIONS

AAM	Malaysia Automotive Association
ASTM	American Standard of Testing Methods
BTE	Brake thermal efficiency
CI	Compression ignition
CN	Cetane number
CNC	Computer numerical control
CO	Carbon monoxide
CO ₂	Carbon dioxide
DAQ	Data acquisition system
EGR	Exhaust gas recirculation
HC	Hydrocarbon
IMEP	Indicated mean effective pressure
NO _x	Nitrogen oxides
PDF	Plastic derived fuel
PM	Particulate matter
SAE	Society of Automotive Engineers
SI	Spark ignition
SO ₂	Sulphur dioxide
TDC	Top dead centre
TDF	Tire derived fuel

LIST OF SYMBOLS

C_d	0.6
d_{pump}	Pump displacement
d	orifice diameter
D	Air density in lb/ft ³
h	100 mm H ₂ O
k	2 (four stroke engine)
n	Maximum engine speed
N_c	Number of cylinder
n_{min}	Minimum engine speed that tested
p	Pressure difference
P_a	1 bar
P_B	Barometric pressure in inches of mercury
$P_{Hydraulic}$	Hydraulic horsepower
P_v	Velocity pressure in inches of water
Q	Flow rate
T_{pump}	Torque absorbed by the pump from the engine flywheel
T_a	293 K (20°C)
V	Air flow rate
V_b	Minimum size of inbox
V_s	Swept volume
η_v	0.8
ω	Engine speed