

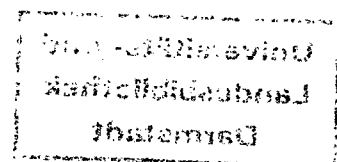
Fundamentals of Motor Vehicle Technology

Fourth Edition

TU Darmstadt FG Fahrzeugtechnik			
Eing. 06. APR. 1999			
R	WV	z. K.	Abl.

V.A.W. Hillier IEng, MIRTE, FIMI
Formerly Principal Lecturer in Automobile Engineering at Croydon College

TECHNISCHE UNIVERSITÄT DARMSTADT
FACHGEBIET FAHRZEUGTECHNIK
PROF. DR.-ING. B. BREUER
PETERSENSTRASSE 30 64287 DARMSTADT
TELEFON 061 51-10 37 99 - Fax 10 51 92



Stanley Thornes (Publishers) Ltd



Contents

<i>Preface</i>	v	Part Four: The Cooling System	
<i>Acknowledgements</i>	vii	22 The function of the cooling system	137
<i>Units and symbols</i>	viii	23 Main features of an air-cooled system	140
		24 Main features of a liquid-cooled system	141
Part One: Vehicle Development and Layout		Part Five: Engine Lubrication	
1 Vehicle development	1	25 The functions and properties of lubricants	155
2 Vehicle layout	4	26 The lubrication system	158
Part Two: The Petrol Engine		Part Six: Bearings	
3 Main parts and working principles	15	27 Plain bearings	167
4 Practical applications of the cycle of operations	18	28 Ball and roller bearings	171
5 Crankshafts	21	Part Seven: The Compression-ignition Engine	
6 Connecting rods	26	29 Cycle of operations	175
7 Pistons, rings and gudgeon pins	29	30 Engine construction: combustion chambers	178
8 Valves and valve-operating gear	36	31 The fuel system	183
9 The cylinder block and crankcase	48	Part Eight: Supercharging	
10 The four-stroke cycle in detail: valve and ignition timing	53	32 Principles of supercharging	199
11 Combustion chambers	58	33 Types of supercharger	201
12 Multi-cylinder engines	64	Part Nine: Alternative Types of Engine	
Part Three: The Fuel System		34 Propulsion units	207
13 The fuel supply system	75	Part Ten: Clutches	
14 The functions of the carburettor and fuel injection system	80	35 The single-plate clutch	213
15 The simple carburettor	84	36 The multi-plate clutch	221
16 Constant choke carburettors	88		
17 Constant-depression carburettors	100		
18 Inlet manifolds	106		
19 Petrol injection	112		
20 Air cleaners and silencers	126		
21 Emission control	131		

Part Eleven: Gearboxes

37 The gearbox	223
38 Sliding-mesh gearbox	231
39 Constant-mesh and synchro-mesh gearbox	237
40 Planetary gearing and unidirectional clutches	244
41 The automatic gearbox	250
42 The overdrive	277

Part Twelve: Propeller Shafts and Drive Arrangements

43 Propeller shafts and universal joints	279
44 Drive arrangements	288

Part Thirteen: Rear Axles

45 Final-drive gears	293
46 The differential	299
47 Rear axle construction	305
48 Four-wheel drive	308

Part Fourteen: Steering Systems

49 Directional control	313
50 Camber, castor and swivel-axes inclination	318
51 Steering components	324
52 Four-wheel steering	331

Part Fifteen: Vehicle Structure

53 General frame construction	337
54 Integral construction of frames	341
55 Heating, ventilating and air conditioning	346

Part Sixteen: Suspension Systems

56 Types and characteristics of metal springs	357
57 Rubber suspension	360
58 Air suspension	362
59 The damper	364
60 Independent front suspension (IFS)	367
61 Independent rear suspension (IRS)	371

Part Seventeen: Wheels and Tyres

62 Wheels	375
63 Tyres	378
64 Wheel balancing	383

Part Eighteen: Brakes

65 Braking principles	385
66 Brake arrangements	391
67 Hydraulic operating systems	399
68 Servo operation	407
69 Anti-lock braking systems	412

Part Nineteen: Electrical Equipment

70 General layout and basic principles	419
71 The battery	424
72 The charging system	429
73 The lighting system	436
74 The ignition system	441
75 The starter system	458
76 Auxiliary equipment	464
77 Fault diagnosis	470

<i>Index</i>	476
--------------	-----