

# LOCOMOTIVE MANAGEMENT

CLEANING—DRIVING—MAINTENANCE

BY

The late JAS. T. HODGSON, M.I.Mech.E.

FORMERLY CHIEF ENGINEER AND SUPERINTENDENT OF WORKS, MUNICIPAL COLLEGE OF  
TECHNOLOGY, MANCHESTER; PRESIDENT, RAILWAY LOCOMOTIVEMEN'S  
CRAFT GUILD, MANCHESTER AND DISTRICT

AND

CHAS. S. LAKE, M.I.Mech.E., M.I.Loco.E.

ASSOCIATE EDITOR, "THE RAILWAY GAZETTE"

*EIGHTH EDITION*

PRICE 8/- NET

Earlier editions were by  
The late JAS. T. HODGSON

AND

The late JOHN WILLIAMS

FORMERLY LOCOMOTIVE INSPECTOR,  
GREAT CENTRAL RAILWAY

LONDON

THE ST. MARGARET'S TECHNICAL PRESS LIMITED

33 TOTHILL STREET, WESTMINSTER, LONDON, S.W. 1

## SYNOPSIS OF CONTENTS

- CHAPTER I.—INTRODUCTION.—HOT-WATER BOILER WASHING-OUT SYSTEM.—SHED REGULATIONS.—LOCOMOTIVE WHEEL ARRANGEMENTS.—HEAD-LAMP CODE.—Commencing as Cleaner.—Advancement of Cleaner.—Boiler and Tank Washing.—Tube Cleaning.—Filling the Boiler.—Blowing Down.—Boiler Washing-out Plant.—Spray Cleaning Plants.—Fitters' Labourers.—Cleaner and Shed Regulations.—Shed Regulations.—Types of Engines.—Wheel Arrangements.—Head Lamps.  
pp. 1-19
- CHAPTER II.—RULES FOR SIGNALS, SHUNTING, AND WORKING OF TRAINS.—Clearing House Rules.—Classification of Signals.—Rules for Fixed Signals.—Hand Signalling.—Audible Signals.—Whistle Signals.  
pp. 21-27
- CHAPTER III.—THE SPARE FIREMAN OR PASSED CLEANER.—Booking on.—Testing Front or Face-plate Fittings.—Building Fire.—Injector.—Leaky Smokebox Door.—Tools.—Ashpan and Firebars.—Checking Water in Tank.—Early Footplate Experiences.—Mounting Tender.—Combustion.—Ignition Temperature.—Carbon Monoxide.—Use of Dart.—Thickness of Fire.—Size of Coals.—Regulation of Air Supply.—Blowing Off.—Returning to Shed.—Coaling.—Ash Disposal.—Soot Blower.—Sand Gun.—Whistles.  
pp. 29-49
- CHAPTER IV.—EXAMINATION FOR FIREMEN.—Practical Questions and Answers on Duties of Firemen.—Smoke Prevention.—Injectors.—Putting Engine Away, etc.  
pp. 51-54
- CHAPTER V.—WATER, HEAT, AND STEAM.—Feed Supply Stations.—Thermometers.—Pressure, Temperature, and Density of Water.—Evaporation.—Classification of Feed Waters.—Heat Conductivity.—Impurities in Feed Water.—Water-softening Plants.—Top Feed.—British Thermal Unit (B.Th.U.)  
pp. 57-68
- CHAPTER VI.—THE LOCOMOTIVE BOILER.—Efficiency of a Boiler.—Improvements in Boiler Construction and in Materials.—Details of Boiler.—Firebox and Tubeplate Stays.—Brick Arch.—Firegrate.—Dome and its Connections.—Regulators.—Safety Valves.—Smokebox and Contents.—Blast Pipes.—Tubes.—Front or Face-plate Fittings.—Live Steam, Exhaust Steam, and Hot-water Injectors.—Failures of Injectors.—Feed-water Heaters.—Feed Pumps.—Boiler Coverings.—Higher Steam Pressures.—Mechanical Stokers.—Turbine Locomotives.—Water-tube Fireboxes.  
pp. 71-119
- CHAPTER VII.—FRAMING, AXLEBOXES, BOGIE, AND SIDE RODS.—Frame Plates.—Axleboxes.—Bearings.—Construction and Erection of Framing.—Construction of Cab.—Sanding Arrangements.—Driving Axles.—Wheels and Tyres.—Springs.—Bogie.—Coupling or Side Rods.  
pp. 121-158
- CHAPTER VIII.—DESCRIPTION AND ERECTION OF ENGINE.—Link Motions.—Valve Gears.—Reversing Gears.—Cylinders.—Slide Valves.—Piston Valves.—Poppet Valves.—Caprotti and Lentz Valve Gears.—Cylinder Relief Valves.—Gland Packings.—Crossheads.—Connecting Rods.—Grease Lubrication.  
pp. 161-219
- CHAPTER IX.—VALVE EVENTS AND SETTING.—Lap and Lead of Valve.—Positions of Eccentrics.—Effect of Notching-up.—Indicators.—Faulty Valve Events Denoted by Indicator Diagram.—Efficiency of Different Points of Cut-off.  
pp. 223-240

- CHAPTER X.—COMPOUND LOCOMOTIVES.—Methods of Compounding.—Efficiency of High-pressure Steam.—Cylinder Ratios.—Slide Valve Adjustment.—Types of Compound Engines.—Advantages and Disadvantages of Compounding. pp. 243-250
- CHAPTER XI.—SUPERHEATED STEAM.—Advantages of Superheating.—Losses Due to Condensation.—Types of Locomotive Superheaters.—Pyrometers.—Smokebox Header and Superheater Header.—Thermocouple.—Management of a Superheated Locomotive Engine. pp. 253-271
- CHAPTER XII.—THE TENDER.—Construction of Tender Framing.—Wheels and Springs.—Construction and Principle of the Water Pick-up.—Water Cranes.—Water Level Indicator.—Tender Brakes. pp. 273-279
- CHAPTER XIII.—BRAKES.—Board of Trade Requirements.—Automatic Vacuum Brake.—Brake Cylinders with and without Ball Valves.—Stopping Distances.—Quick Service Valve.—Ejectors.—Steam Brake.—Construction and Upkeep of Steam Brake.—Westinghouse Automatic Brake.—Air Pump.—Reservoirs and General Arrangements.—Driver's Equalising Brake Valve.—Triple Valves.—Brake Cylinders.—Slack Adjuster.—Westinghouse-Vacuum Proportional Valve.—Operation and Maintenance of the Air Brake. pp. 281-332
- CHAPTER XIV.—LUBRICATION.—Forms of Lubricators.—Trimmings.—Axlebox Lubricators.—Syphon Lubricators.—Mechanical Lubricators.—Forced Lubrication.—Hydrostatic Lubricator.—Sight-feed Lubricator.—Anti-carboniser.—Atomisers. pp. 335-363
- CHAPTER XV.—CLEARING HOUSE RULES.—Rules Appertaining to Drivers and Firemen.—Wrong Line Orders.—Single-line Working, etc. pp. 365-370
- CHAPTER XVI.—DUTIES OF THE DRIVER.—Going on Duty.—Engine Inspection.—Adjustment of Rod Ends.—Ejector and Brake Pump.—Speed Calculation.—Speed Indicators.—Speed Chart.—Returning to Shed.—Testing for Faulty Valves and Pistons.—Faulty Beats.—Relative Piston, Crank, Valve, and Side Rod Positions. pp. 373-397
- CHAPTER XVII.—DEFINITIONS AND EQUIVALENTS OF TECHNICAL TERMS AND LOCOMOTIVE DATA. pp. 399-401
- CHAPTER XVIII.—EXAMINATION ON RULES.—Questions and Answers on Clearing House Rules, as Affecting the Duties of Drivers and Firemen. pp. 403-408
- CHAPTER XIX.—EXAMINATION ON BOILER.—Practical Questions and Answers on the Construction, Function, Working, and Upkeep of the Different Parts of a Locomotive Boiler. pp. 411-417
- CHAPTER XX.—EXAMINATION ON ENGINE.—Practical Questions and Answers on the Construction, Function, Working, and Upkeep of the Different Parts of a Locomotive Engine. pp. 419-425
- CHAPTER XXI.—EXAMINATION ON BRAKES.—Practical Questions and Answers on the Construction, Function, Working, and Upkeep of the Different Parts of the Brakes, including the Automatic Vacuum, Steam, and Westinghouse Air Brakes. pp. 427-438
- CHAPTER XXII.—EXAMINATION ON BREAKDOWNS.—Practical Questions and Answers on Causes of Engine Failures.—Methods of Procedure in Taking Down Motionwork, etc.—Temporary Repairs while out on the Road. pp. 441-455
- APPENDIX.—THE LOCOMOTIVE BOOSTER AND GOODALL ARTICULATED