BAYUBALI ENGINEERING SDN BHD

STEAM BOILER ENGINEERS GRADE ONE (1) COURSE

	Training Dates:	As per schedule	**Training Venue:**	ALAF, Kuantan, Malaysia.
	Basic Fee:	RM4,000.00 + SST per participant, which includes course materials, meals, refreshments, and an attendance certificate. The fee excludes the examination.		

DURATION

28 hours (Four (4) days)

TARGET GROUP

Engineers who have held a Grade 2 Steam Engineer's Certificate of Competency for at least six (6) months and intend to sit for the Grade 1 Steam Boiler Engineer's Certificate of Competency examination with the Department of Occupational Safety and Health, Malaysia (DOSH).

TARGETED INDUSTRY/INDUSTRIES

Oil & Gas, Petrochemicals, Power Plants, Renewable Energy Plants, Co-Generation Plants, Palm Oil Mills and Refineries, Plywood Industries, Hotels, and all industries that use steam for heating and mechanical drive.

CERTIFICATION

This course is approved by the Department of Occupational Safety and Health (DOSH), Malaysia.

COURSE OBJECTIVE

This course will provide participants with detailed knowledge of the responsibilities of personnel involved in manufacturing, fabricating, and inspecting new steam boiler plant components, along with new construction activities as defined by ASME Section I and the Occupational Safety and Health Act, 1994 (Amendment 2022).

The training course aims to enhance engineers' understanding of the requirements for selection, construction, commissioning, operation, inspection, repair, and maintenance of steam boilers. It aligns with International Codes & Standards and Malaysian laws.

This course is mandatory for individuals intending to apply for the First Grade Steam Boiler Engineer's License examination with DOSH.

COURSE OUTCOMES

At the end of the course, delegates will be able to:

- Identify the related laws, codes, and standards for steam boiler design, installation, fabrication, operation, inspection, repair, and maintenance.
- Recognize the roles and responsibilities of the first-grade steam engineer.
- Recognize plant safety, management, maintenance policy, and Boiler House Management.
- Calculate the mechanical design of steam boiler main pressure parts, such as drums, tubes, and headers.
- Recognize the major hazards related to operating and maintaining boilers and steam systems.
- Safely operate steam boilers and steam systems.
- Describe the processes involved in boiler commissioning, operations, troubleshooting, inspections, repairs, and maintenance.
- Identify safety rules for boiler operation, from industrial combustion phenomena to feed water quality.
- Prepare to sit for the examination of the First Grade Steam Engineer's Certificate of Competency (Part 1 and 2) with the Department of Occupational Safety and Health, Malaysia (DOSH).

TRAINING METHODOLOGY

- Lecture
- Pre- and Post-Test
- Site visit
- Classroom discussions
- Short video presentation
- Case study

COURSE CONTENT

CHAPTER 1 – LAWS AND STANDARDS

- Occupational Safety and Health Act, 1994 (Act 514) (Amendment 2022)
- Occupation Safety and Health (Plant Requiring Certificate of Fitness), Regulations 2024
- Occupation Safety and Health (Plant Requiring Certificate of Fitness), Regulations 2024: Schedule 8 – Essential Fittings
- Occupational Safety and Health (Notification of Accident, Dangerous Occurrence, Occupational Poising and Occupational Disease) Regulations 2004
- Occupational Safety and Health (Use and Standards of Exposure of Chemicals Hazardous to Health) Regulations 2000.

- Industry Code of Practice for Safe Working in A Confined Space 2010.
- Industry Code of Practice for Management of Occupational Noise Exposure and Hearing Conservation 2019.
- Guidelines on Heat Stress Management at Workplace 2016.
- Guidelines On Ergonomics Risk Assessment at Workplace 2017.
- Plant safety, management, and maintenance policy.
- Steam Engineer's Roles and Responsibilities.
- Boiler House Management.

CHAPTER 2 – BOILER DESIGN

- Applicable Codes and Standards
- Steam Plant Conceptual Design
- Boiler Design
- Boiler fabrication process
- Boiler Components
- Parts, Essential Fittings and Safety Devices

CHAPTER 3 – STEAM BOILER OPERATIONS

- Fundamental Operational Responsibilities
- Start-up and Shutdown
- Burner Operation and Interlock System
- Water Level Control System
- Pressure Control System
- Forced Draft Control System
- Furnace Purging
- Blowdown Control System
- Steam Pressure Control System
- Test Gauge Glass
- Emergency Shutdown
- Steam Management
- Boiler Efficiency & Burner Efficiency
- Storage of Idle Boiler
- Steam traps
- Boiler Water Treatment
- Steam Turbine Fundamentals
- Combustion Fundamentals

CHAPTER 4 – STEAM BOILER INSPECTION, MAINTENANCE AND REPAIR

- Materials, Creep and Fatigue, Corrosion and Controls
- Welding Process
- Non-Destructive Testing (NDT)
- Welding Mechanical Failures (Welding Defects)
- Boiler Defects and Potential Root Cause

CHAPTER 5 – MACHINERY INTEGRITY

- Introduction to Fitness for Service (FFS)
- Introduction to Process Safety Management's Element

TRAINING AND EXAMINATION REQUIREMENTS

General Requirements

- Must be a **Malaysian citizen**.
- Have adequate working experience in Occupational Safety and Health.
- Must not have been charged or found guilty of any offenses under Act 514 or its Regulations.
- Certified medically fit by an Occupational Health Doctor (OHD).
- Attend a **Steam Boiler Engineer Grade 1 Course** conducted by a DOSH-approved training provider.
- Submit a registration application within one (1) year after passing the Steam Engineer exam.

Requirements for Grade 1 Steam Boiler Engineer Examination

a) Have at least **six (6) months** of work experience as a **Steam Boiler Engineer Grade 2**.
b) Have work experience in **operating, handling, or maintaining** a steam boiler where the total heating surface of all connected steam boilers exceeds **2,000 m²**.
c) Obtain **confirmation** from the **employer or a Grade 1 Steam Boiler Engineer** verifying the fulfilment of **items (a) and (b)**.

ABOUT THE INSTRUCTOR



Ir. Mohd Normarzuki bin Ya'acob graduated with a Bachelor's (Honors) in Mechanical Engineering from the University of Malaya. He is a registered Professional Engineer with a Practicing Certificate (Mechanical) from the Board of Engineers, Malaysia (BEM), a Corporate Member of The Institution of Engineers, Malaysia (IEM) and a Professional Technologist from the Malaysia Board of Technologist (MBOT). Additionally, he holds certification as a First Grade Engineer (Steam Boiler and Internal Combustion Engine) from the Department of Occupational Safety and Health (DOSH).

His professional journey includes significant roles at various companies, including Equator Engineering Sdn Bhd, Tenaga Nasional Berhad, Petronas Gas Berhad (Gas Processing Plant 5/6 and Centralized Utilities Facility), and Qatar Petroleum (where he served as the Head of Short Technical Training). Presently, he serves as the Managing Director at Bayubali Engineering Sdn Bhd.

Throughout his career. Mohd Normarzuki has gained extensive field experience in steam boiler operation, troubleshooting, inspection, maintenance, and repair. He possesses expertise in project management, design, selection, specification, installation, maintenance, operation, plant optimization, and troubleshooting of utility facilities in the oil and gas industry.

He is also a co-author of the book "An Introduction to Steam Machinery," published by the University of Malaya Publisher.