

# **Curriculum for Industrial Machine Operation and Maintenance VG3 / in-service training at a training establishment**

Dette er en oversettelse av den fastsatte læreplanteksten. Læreplanen er fastsatt på Bokmål

Laid down as a regulation by the Norwegian Directorate for Education and Training on 14 December 2007 as delegated in a letter of 26 September 2005 from the Ministry of Education and Research pursuant to the Act of 17 July 1998 no. 61 relating to primary and secondary education (Education Act) Section 3-4 first paragraph.

Valid from 01.08.2008

## Purpose

Industrial Machine Operation and Maintenance shall lay the foundation for working in manufacturing and assembly, and doing maintenance and repair work for land-based industries, offshore and shipyards. These kinds of industries are characterised by continuous technological development with increasing degrees of automation. The subject shall contribute to the stable and optimal operation of industrial machines and equipment.

Learning in the subject shall provide the apprentice with comprehensive skills in manufacturing and for assembling mechanical elements and doing maintenance and repairs on machines and equipment. Furthermore, learning shall contribute by developing the apprentice's ability to adapt to reorganization and developing a comprehensive understanding of mechanical processes. Learning in the subject shall promote an understanding of mechanical structures, along with adjustments and controlling these machines.

Learning in the subject shall prepare the apprentice for planning, executing, assessing and documenting his or her work. Furthermore, learning shall prepare the apprentice to work independently and cooperate with other professionals and trades, and promote professional development. Learning in the subject shall prepare the apprentice for working with Environment, Health and Safety at work. The company's organization and quality, information and decision-making systems are a part of learning.

Training completed and passed in the subject will lead to a Trade Certificate.

The professional title is Industrial Machinery Mechanic.

## Structure

Industrial Machine Operation and Maintenance consists of three main subject areas. The main subject areas complement each other and should be viewed in relation to one another.

### Overview of the main subject areas:

Year level	Main subject areas		
Vg3 / In-service training at a training establishment	Manufacturing and assembly	Maintenance and repairs	Documentation and quality

## Main subject areas

### Manufacturing and assembly

The main subject area covers planning of work tasks, selecting materials, and manufacturing, assembling and starting mechanical components in technical industrial machines and equipment. It also covers industrial assembly and surface treatment. The main subject area also covers planning and assembling automated pneumatic and hydraulic control systems for machines and equipment. Safe execution of lifting operations is a part of the main subject area.

## Maintenance and repairs

The main subject area covers troubleshooting, error rectification and condition assessments on machines and equipment. Learning methods for joining materials, doing maintenance, testing and taking measurements on components are a part of the main subject area. The main subject area also covers connection and disconnection of electrical parts on machines and equipment, along with cleaning, lubricating and adjustment work.

## Documentation and quality

The main subject area covers the use of working drawings, filling in forms, reading diagrams, following procedures, and understanding standards and control systems for planning, execution and documenting work. Registration of documents and dealing with deviations based on the company's requirements for Environment, Health and Safety & Quality are central aspects of the main subject area.

## Basic skills

Basic skills are integrated into the competence aims for this course in areas where they contribute to the development of and are a part of the basic subject competence.

In Industrial Machine Operation and Maintenance, basic skills are understood as follows:

*Being able to express oneself orally in Industrial Machine Operation and Maintenance* involves discussing safety issues, selecting professional solutions, planning and executing work with customers and colleagues.

*Being able to express oneself in writing in Industrial Machine Operation and Maintenance* involves preparing reports and documentation related to finished work.

*Being able to read in Industrial Machine Operation and Maintenance* involves finding, understanding and complying with rules, work descriptions, drawings and specifications, along with legislation for Environment, Health and Safety and quality requirements.

*Numeracy in Industrial Machine Operation and Maintenance* involves dimensioning and adjusting machines and doing economic calculations related to the use of materials and the selection of equipment.

*Digital literacy in Industrial Machine Operation and Maintenance* involves using digital planning and control systems. This also involves using testing and measuring instruments and searching for information.

## Competence aims

### After Vg3

### Manufacturing and assembly

*The aims of the training are to enable the apprentice to*

- plan and execute work in line with current rules and regulations for Environment, Health and Safety and working procedures

- dismantle, repair, re-assemble, install and do functions tests on mechanical components for the company's production line
- select materials for work based on working drawings and specifications
- select and use machines and equipment to slice, cut and saw according to the work at hand
- select and use processing and finishing machines for lathing, milling, drilling, broaching, honing, sheet work and pipe work based on specifications and the customer's requirements for quality
- select and use cutting tools and set up manufacturing machines in line with drawings and working descriptions
- assemble and put automated pneumatic and hydraulic guidance system into operation at the company's production line
- do strapping and hooking work, and learn signalling and rigging in line with current rules for this
- do corrosion protection and surface treatment on different materials for one's work
- assemble, modify and test mechanical components according to specifications

## **Maintenance and repairs**

*The aims of the training are to enable the apprentice to*

- perform maintenance and repair tasks according to current rules, legislation and the manufacturer's technical documentation
- plan jobs and do maintenance, troubleshoot, repair and carry out functions tests on mechanical components, and elaborate on the alternative solutions available
- disconnect and reconnect the electrical system for doing repairs and maintenance work according to current rules and regulations
- select and use digital and analogue measuring instruments based on requirements for precision
- measure pressures, temperatures and quantities and evaluate the results of these measurements with a thought to quality requirements
- do packaging and use insulation materials according to specifications
- select oils, lubricants and fastening materials according to specifications and product data sheets
- do heat treatment on materials pursuant to maintenance and repair tasks
- select gases adapted to the particular work task and handle the gasses in line with current requirements for Environment, Health and Safety
- use welding methods to do maintenance and repair work according to current standards

## **Documentation and quality**

*The aims of the training are to enable the apprentice to*

- inspect and document finished work in line with current rules and regulations for Environment, Health and Safety, working procedures and quality assurance systems
- record deviations, prepare deviation reports and carry out corrective measures
- perform calculations related to the use of materials and selection of equipment
- prepare reports and fill in forms according to the work task
- do source separation and handle waste according to routines and current rules for this
- use information and decision-making systems, and give an account of the company's organization

# **Assessment**

## **Vg3 Industrial Machine Operation and Maintenance**

Provisions for final assessment:

<b>Main subject areas</b>	<b>Provision</b>
Manufacturing and assembly  Maintenance and repairs  Documentation and quality	All apprentices shall take a trade examination, which is normally carried out over a period of eight working days.

The provisions for assessment are stipulated in the regulations of the Norwegian Education Act.