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Lifelong Learning Programme 2007-2013 – Leonardo da Vinci

Project: Transfer of innovation identifying vocational competence within vocational education in the metal and electrical sector as illustrated by two vocations

Leonardo da Vinci Programme
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Berlin
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Metal and mechanical sector:

About **40%** of industrial workers are employed in this sector, which produces around **40%** of the country's added value

About **121,000** enterprises >> **2 million** employees

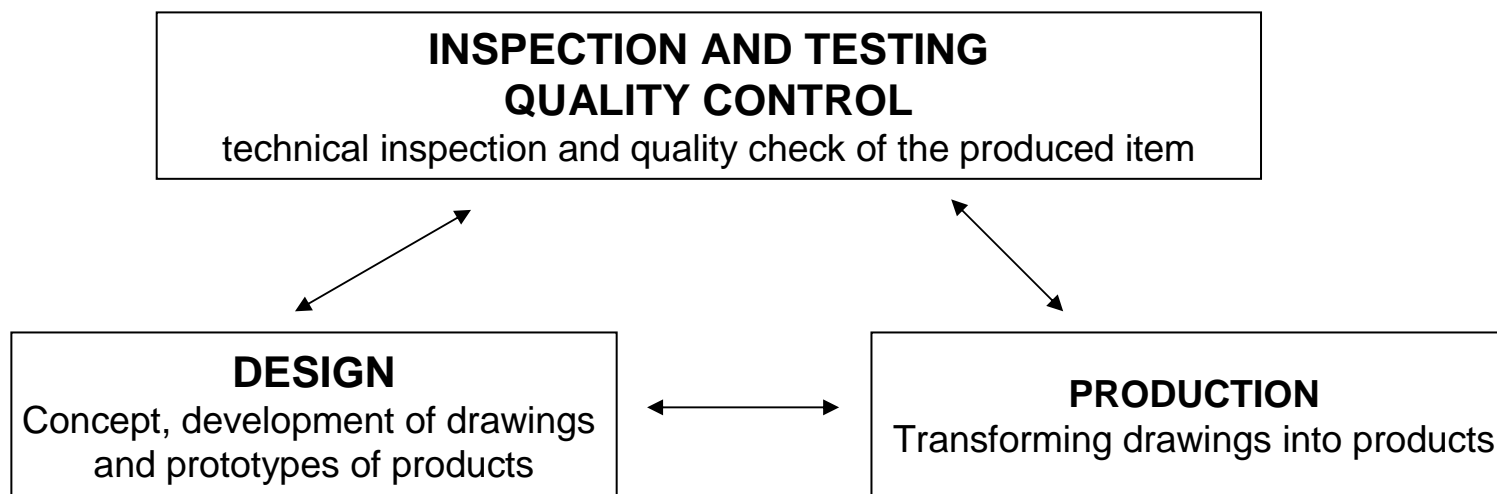
Professional subsectors:

- iron metallurgy / casting house
- means of transport, nautical mechanics, aeronautics
- machine tools and production of machines in general, industrial plants
- electrical household appliances
- general mechanics



PRODUCTION PROCESS

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MANUFACTURING AND METAL AND MECHANICAL INDUSTRIES IN ITALY

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YEAR 2006

SECTOR	MANUFACTURING		METAL AND MECHANICAL	
	N. ENTERPRISES	EMPLOYEES	N. ENTERPRISES	EMPLOYEES
ITALIA	542.876	4.894.796	267.000	1.740.000
VENETO	66.096	497.472	25.873	242.568

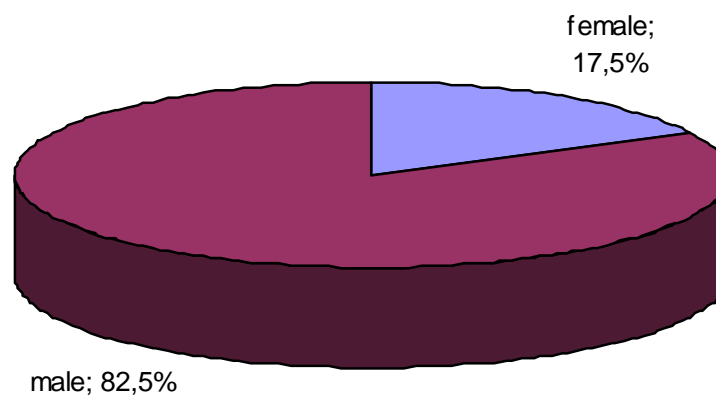


METAL AND MECHANICAL INDUSTRIES EMPLOYEES QUALIFICATION AND GENDER

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YEAR 2005

Total: Male 82,5% - Female 17,5%



Qualification	Total %	male %	female %
Workers	59,6	64,0	50,2
Employees	40,3	35,5	49,3
Apprentices	0,1	0,5	0,5



METAL AND MECHANICAL INDUSTRIES EMPLOYEES QUALIFICATION AND GENDER

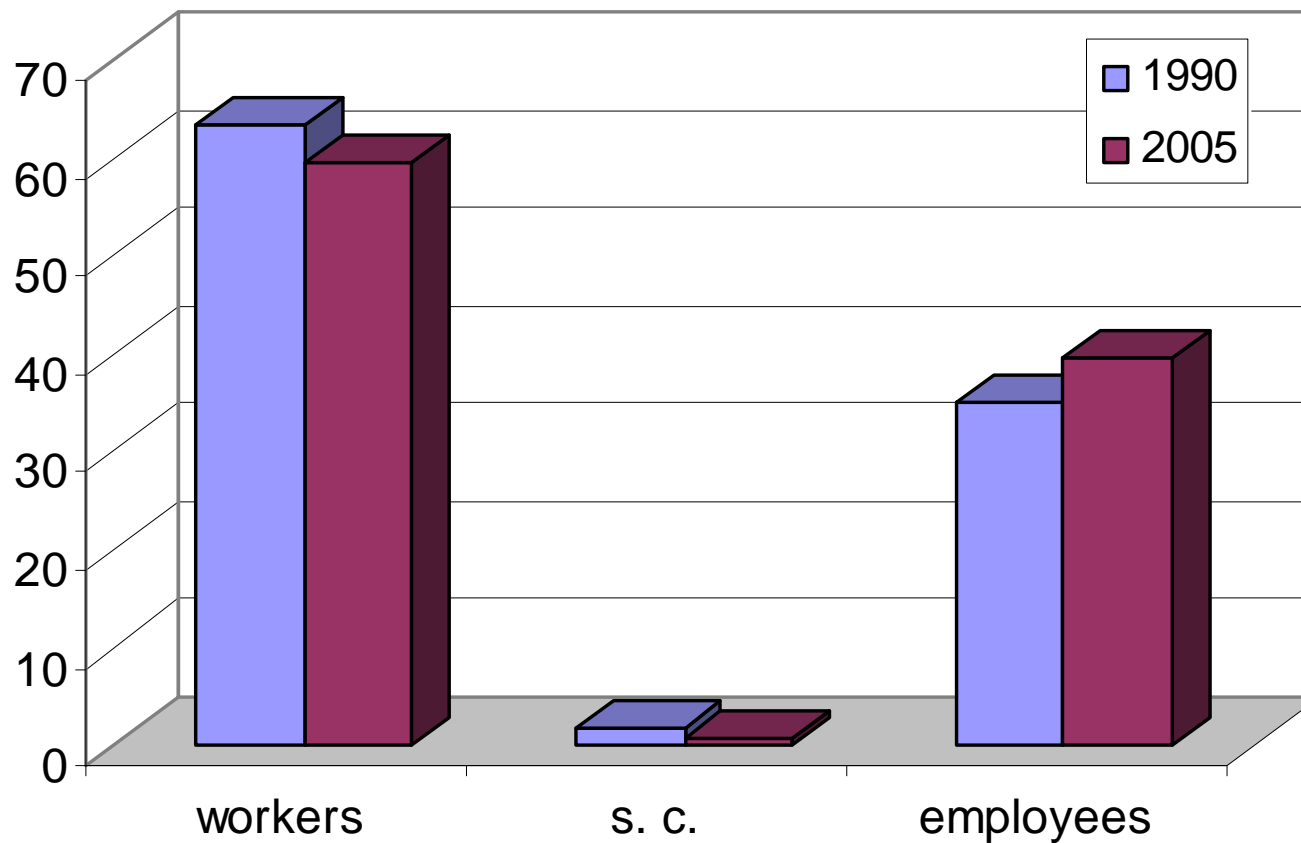
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Qualification	Year 1990 % (a)	Year 2005 % (b)	Δ (b) - (a)
Workers	63,5	59,7	-3,8
Level 1	0,1	0,2	+0,1
Level 2	4,1	2,0	-2,1
Level 3	26,4	25,2	-1,2
Level 4	19,7	18,5	-1,2
Level 5	13,2	13,8	+0,6
Special Categories	1,6	0,7	-0,9
Employees	34,9	39,6	+4,7
Level 2	0,1	0,0	-0,1
Level 3	0,4	0,2	-0,2
Level 4	3,0	1,5	-1,5
Level 5	10,0	6,8	-3,2
Level 5S	2,3	2,7	+0,4
Level 6	11,5	13,7	+2,2
Level 7	7,6	14,6	+7,0
Total	82,5	17,5	-



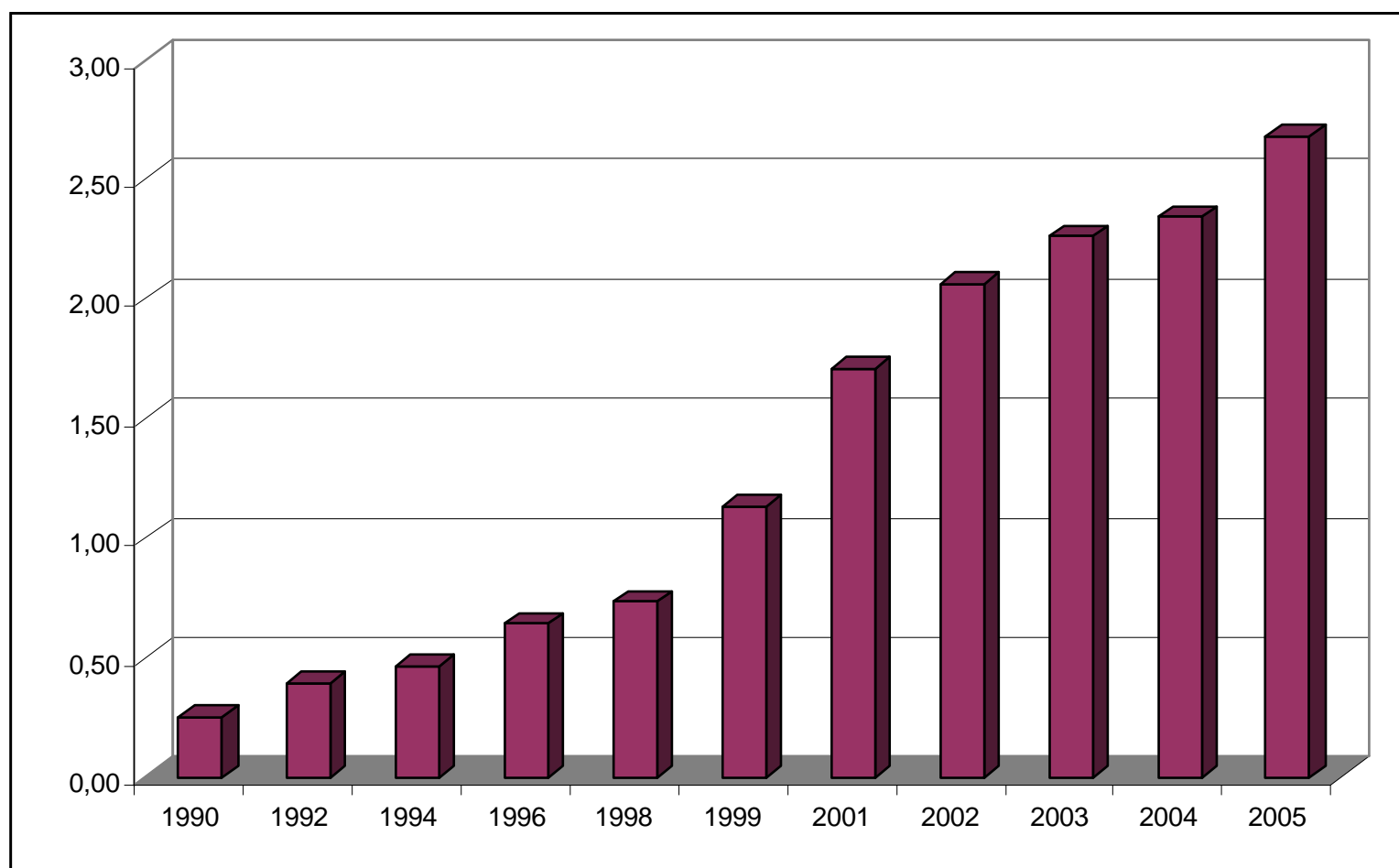
METAL AND MECHANICAL INDUSTRIES EMPLOYEES QUALIFICATION

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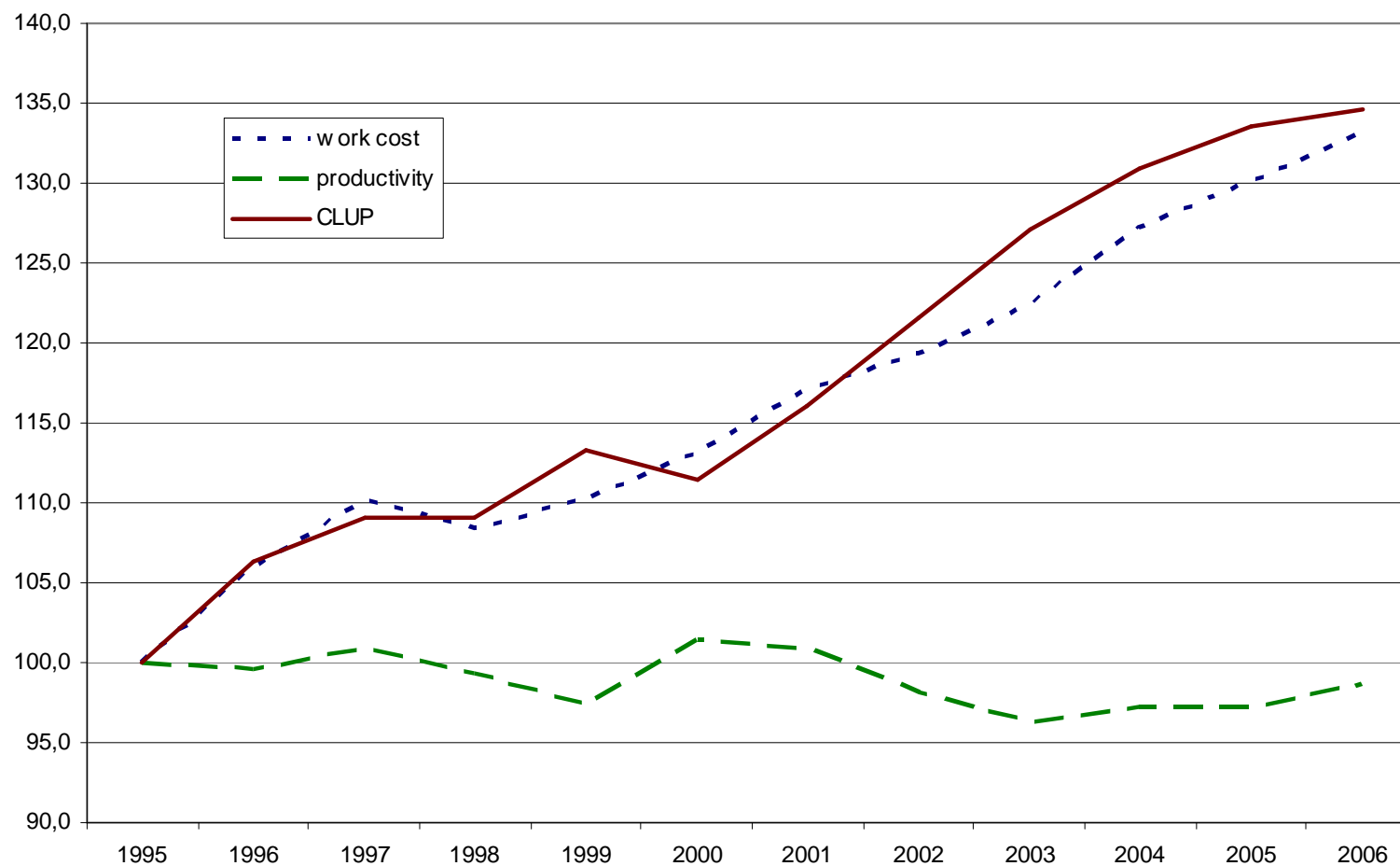
IMMIGRANT WORKERS

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WORK COST, PRODUCTIVITY, CLUP

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The typical professional figures of the metalworking sector have been divided into three main groups:

Factory workers: • Assembler / Installer • Inspector • Welder • Painter • Maintenance mechanic • Operator of automatic, semiautomatic and numerically controlled machine tools.

Technicians: • Foreman • Draftsman, CAD-CAM designer • In-production quality control expert.

Managers: • Production manager • Design manager • Quality Manager.



DESIGN MANAGER

This professional figure coordinates the design team in charge of developing a new product, a mechanical part or a new production facility

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SKILLS AND COMPETENCES

- knowledge of **design-related technical aspects**
- **managerial as well as product marketing skills**
- **specialized technical** knowledge

EDUCATION AND TRAINING

- a **university degree** is required

WORK EXPERIENCE

- previous good **experience** within a design team

TYPE OF WORK INVOLVED

- leading, managerial and work team coordination tasks
- priority communication with the **Production Department** and the **Sales Department**
- **wide autonomy**



PRODUCTION MANAGER

This is a high-profile figure, whose tasks are to direct and coordinate business and human resource activities

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SKILLS AND COMPETENCES

- **principles of business organization and HR management**
- **production methods and time used**
- **contract regulations, safety and prevention rules**

EDUCATION AND TRAINING

- a **university degree** is required, preferably in **Engineering**

WORK EXPERIENCE

- career development based on the possession of a **high education degree**, and especially on the **size of the company** where the Production Manager works

TYPE OF WORK INVOLVED

- relations with the company's top management and interaction with the other Department Managers
- **foremen** reporting to him/her
- high **degree of autonomy**



QUALITY MANAGER

He/She is in charge of defining the quality system of the company, in compliance with ISO regulations, by planning and implementing actions for continuous improvement

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SKILLS AND COMPETENCES

- building the **quality** system on the basis of the reference standards
- **planning and implementing** actions to control business processes
- knowing both the specific **regulations** and **business analysis** methods

EDUCATION AND TRAINING

- a **university degree** is required; further completion of education and training is required through specialization and refresher courses

WORK EXPERIENCE

- first work experiences usually as **consultant**
- can apply for the position of **Department Manager** in medium and large industrial enterprises

TYPE OF WORK INVOLVED

- operating within the Quality Assurance department as an **employee** of the company, and within small-sized enterprises as an **external consultant**
- working in close cooperation with the **Certification Body** and with the **Managers of other Departments**
- remarkable degree of **autonomy**



CAD-CAM DESIGNER AND DRAFTSMAN

This professional figure is in charge of designing and drawing industrial products by using IT tools such as CAD and CAM systems

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SKILLS AND COMPETENCES

- being able to **read a project and represent it graphically**
- knowing the **international rules** of standardization for drawings (UNI standards)
- performing the **complete mechanical drawing**, dealing with the **bill of materials** for the item to be produced, planning its **technical specifications**

EDUCATION AND TRAINING

- a **senior secondary school diploma** is required, preferably in a **technical-industrial field**
- preparation through **professional courses** envisaging a period of training with an expert worker as **tutor**

WORK EXPERIENCE

- career development leading to the position of Design Manager

TYPE OF WORK INVOLVED

- operating within a **work team** and reporting to the **Design Manager**
- communication with the **Production Department** and the **Sales Department**
- activities regulated by **standard procedures**



IN-PRODUCTION QUALITY CONTROL EXPERT

He / She performs activities of control, evaluation and analysis of the production processes and of the products, in order to assure the total quality of the product for the customer

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SKILLS AND COMPETENCES

- ability to **schedule, organize and direct internal audits** in the production area pertaining to the company's own quality system and to that of the company's suppliers
- deep knowledge of the company's **products**, of the **technology** required, of the organization and **production methods**

EDUCATION AND TRAINING

- a **senior secondary school diploma** is required, preferably in a **technical field**

WORK EXPERIENCE

- opportunity to work as an **employee** in a medium or large enterprise of the metalworking sector

TYPE OF WORK INVOLVED

- mainly interacting with **skilled workers, inspectors, foremen** and the **Production Manager**



FOREMAN

This is a particularly professional position, drawing on work experience to achieve the ability to coordinate and direct work teams operating in a specific production department

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SKILLS AND COMPETENCES

- generally a **factory worker** who, having acquired considerable experience and being able to assume tasks of responsibility, is in a position to **plan the shop floor activities**
- knowledge of the implementation of **Quality procedures**
- **supervision** of machine planning

EDUCATION AND TRAINING

- a **senior secondary school diploma** or a **professional skills qualification** are required

WORK EXPERIENCE

- longstanding experience required in the Production department of a company

TYPE OF WORK INVOLVED

- **employee** position whose tasks are to **direct, manage and coordinate** the work team
- communication with the **Production Manager**, the **Quality Manager**, the **Warehouse** personnel, the **Testing** department and with the **Design Department** engineers



MAINTENANCE MECHANIC

He / She is a factory worker who is able to perform routine and extraordinary maintenance interventions on machinery for production, by carrying out periodical checks and repairs

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SKILLS AND COMPETENCES

- knowledge of **mechanical technology** and **technical drawing**
- ability to use **assembly** and **measurement** tools and equipment
- **problem prevention** and **problem solving** attitudes required

EDUCATION AND TRAINING

- OJE – **on-the-job experience** is a fundamental prerequisite

WORK EXPERIENCE

- possible initial work experience as **Fitter**, then as **Mechanic Assembler** or **Installer** of machinery and systems

TYPE OF WORK INVOLVED

- close communication with the **operators** of machines on which maintenance is performed, with the **Chargehand** or the **Maintenance worker**
- activities are regulated by **standard procedures**, although the **ability to take action autonomously** is required



ASSEMBLER / INSTALLER

Is in charge of scheduling and performing the assembly and installation of machinery and systems, by carrying out periodical checks and extraordinary maintenance interventions

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SKILLS AND COMPETENCES

- **full knowledge** is required of tasks and functions of the other professional figures
- knowledge of **materials** is required, as well as basic knowledge of **electronics, mechanics and electromechanics**, and the ability to perform **steel structural and welding** work

EDUCATION AND TRAINING

- a **school-leaving certificate from junior secondary school** is the minimum requirement, although a **senior secondary school diploma** or a **professional skills qualification** are preferable

WORK EXPERIENCE

- The Installer can have good previous experience as Carpenter, Welder, Fitter, Line operator or Maintenance worker

TYPE OF WORK INVOLVED

- opportunity to work in the Production department of small, medium and large enterprises of the metalworking sector
- close communication with the **Technical Department** and its **draftspeople/designers**, with the **Warehouse department** and the **Purchasing Department**



INSPECTOR

This operator is in charge of controlling the company's products, by performing functionality tests and implementing procedures, techniques and quality standards set by the company

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SKILLS AND COMPETENCES

- required knowledge ranges from **technical** skills to wider competences related to the **production process**; knowledge of **mechanical drawing** is required
- ability to perform **mechanical tests, identification of errors, knowledge of test instruments**

EDUCATION AND TRAINING

- a **senior secondary school diploma** is required, preferably in a **technical field**

WORK EXPERIENCE

- must have had suitable experiences in the production area, showing talent and ability in test operations

TYPE OF WORK INVOLVED

- this function takes on a **transversal nature**
- activities are regulated by **standard work procedures**



PAINTER

The Painter is a skilled worker who is able to complete painting of all body parts, or of other components making up the final product, by using special painting equipment

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SKILLS AND COMPETENCES

- knowledge and ability to use painting **machines and tools**
- knowledge of **materials quality and reactions**
- ability to match manual skills with the ability to control automated machines

EDUCATION AND TRAINING

- a **school-leaving certificate from junior secondary school** is the minimum requirement
- however, **on-the-job** experience is a fundamental prerequisite

WORK EXPERIENCE

- career development based on the abilities shown by each operator
- experience can lead to a position of Foreman or Shop Foreman

TYPE OF WORK INVOLVED

- **employee** position generally within a **work team** operating on the production line



MACHINE TOOL OPERATOR

He / She is in charge of the machining, construction, assembly or overhaul of a mechanical part, according to specially drawings or by using a sample piece as a model

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SKILLS AND COMPETENCES

- knowledge of **general mechanics** and **electromechanics** pertaining to machine tools
- ability to read and interpret **mechanical drawing**
- basic knowledge of **prevention techniques** and **safety regulations**

EDUCATION AND TRAINING

- a **school-leaving certificate from junior secondary school** is the minimum requirement
- **on-the-job** experience is a fundamental prerequisite

WORK EXPERIENCE

- career development based on the abilities shown by each operator
- experience can lead to a position of Chargehand, Foreman or Shop Foreman

TYPE OF WORK INVOLVED

- reporting to his/her direct superior (Chargehand or Foreman)
- activities are regulated by **standard procedures**



WELDER

This is a skilled worker who is able to take initiative in welding the parts of a product, by using knowledge, techniques and the most suitable materials

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SKILLS AND COMPETENCES

- basic knowledge of **mechanical drawing**, knowledge on the **technology of weldable materials**
- knowledge and implementation of **operational techniques for the various welding types**
- ability to perform **steel structural work and workbench assembly** of parts

EDUCATION AND TRAINING

- a **school-leaving certificate from junior secondary school** is the minimum requirement
- **on-the-job** experience is a fundamental prerequisite

WORK EXPERIENCE

- The high degree of specialization required for this professional figure may hamper access to other professional tasks within the company

TYPE OF WORK INVOLVED

- **employee** position within a **work team**
- activities are regulated by **standard procedures**
- work situation may vary considerably, depending on the **company size** and on the **technologies used** in production



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