

HEAVY MACHINERY & EQUIPMENT



Locomotive engines, trucks, earthmovers and agricultural machinery... would you like to be involved in the manufacture or maintenance of these and other 'heavies' like cranes, buses or industrial equipment?

There are heaps of opportunities to work in the manufacture and maintenance of heavy machinery, mobile plant and other equipment. This equipment is found in many industries such as mining, mineral exploration and oil and gas drilling and transport.

You can work as a Maintenance Fitter (installing and maintaining precision components), Machinist (using machine tools to manufacture components), Diesel Fitter (installing, diagnosing, servicing and repairing engines), Boilermaker (welding and structural fabrication of equipment), Toolmaker or Blacksmith. You can work in Surface Finishing of precision parts. Further study and experience could see you become a Technical Officer or even a Design or Maintenance Engineer.

If you like big machines and big challenges and like finding innovative, workable solutions to technical problems, then you can look forward to a very satisfying career.



Derek Boo

"I'm a mechanical engineer and my job basically involves maintaining and improving the reliability of the plant and systems on site. What's really exciting in my job is being responsible for a large-scale engineering project, which may involve a re-aligning of the whole mill: this would involve a few hundred contractors who are under your control.

With the skills that I have obtained so far, I'll have opportunities to travel around the world and work in different places..."

Mechanical Engineer @ KCGM

...For the complete case study and other fascinating stories, order your free copy of zoom+, the comprehensive interactive Manufacturing careers CD-ROM.

Call MSA on 1800 358 458 or go to www.zoomplus.aigroup.asn.au



manufacturing. alive.

www.makeit.net.au www.zoomplus.aigroup.asn.au www.mskills.com.au

HEAVY MACHINERY & EQUIPMENT ENGINEERING DESIGN



Heavy machinery and equipment provides the 'power' to drive our world, and each and every piece is first designed, then engineered so that it can be produced economically and to the highest quality standards.

Would you like to learn to research and develop new heavy engineering products and processes? As an Engineer, you will use design software to prepare technical drawings and specifications for new products or processes and then oversee their development. You might specialise in specific engineering disciplines such as Mechanical, Structural Fabrication or Electrical design.

You will use drawing, drafting and design skills to create detailed drawings using Computer Aided Design software (CAD). You can also specialise in computer-generated diagrams and models, in two (2D) and three dimensions (3D).



Christine Stock has completed one year of industrial design and is in her final year of a Mechanical Engineering apprenticeship. She has completed a Diploma of Engineering (Mechanical), is studying for her Advanced Diploma of Engineering and is Project Engineer for Electrolux Home Products. All this before turning 24!

Not surprisingly, Christine won Apprentice of the Year at the South Australian Training Awards and Apprentice of the Year DEST Training Awards.

MECHANICAL MS

Engineers also develop specifications for new products in terms of cost, quality, production method, application of new technology and business objectives. The skills you will learn in working on heavy machinery could also see you moving across to work in related fields such as Cast Metals, Light Fabrication, Aerospace and Automotive.

Relevant qualifications that could lead to a job in this area are to be found in the Metal and Engineering Training Package ([see the Qualifications InfoSheet](#)).



manufacturing. alive.

www.makeit.net.au www.zoomplus.aigroup.asn.au www.mskills.com.au

HEAVY MACHINERY & EQUIPMENT ENGINEERING MECHANICAL



Mechanical Tradespeople keep our country running by manufacturing and maintaining machines, equipment and components that are essential to all of our industries. A trade in Toolmaking, Hydraulics/Pneumatics, Refrigeration/Air Conditioning or Fitting and Machining will get you started in a great career in Mechanical Engineering.

You could manufacture products such as industrial machinery and refrigeration, mining equipment, agricultural machinery, elevators, escalators and engines.

Machinists set up and operate machine tools and computer controlled equipment to cut and shape steel and other materials to manufacture parts or machinery. Fitters assemble, repair and install components and machinery to very precise tolerances. Toolmakers make precision machine tools, dies and other equipment used to



Metaltec Precision International designed, manufactured and integrated the magnet positioning structure for Victoria's Synchrotron project. This complex array of 70 girders and beams support and align a series of giant magnets and vacuum chambers that accelerates electrons to almost the speed of light around a storage ring that is 60 metres in diameter.

The critical and extremely precise adjustment system allows the structure to be manipulated with controlled movements less than 0.01 mm.

NEED FOR SPEED

manufacture various components and products. There are many opportunities at a technical or professional level as well.

The skills you gain could also see you moving across to work in related industries such as Light Fabrication, Aerospace, Marine and Automotive.

Relevant qualifications that could lead to a job in this area are to be found in the Metal and Engineering Training Package ([see the Qualifications InfoSheet](#)).



manufacturing. alive.

www.makeit.net.au www.zoomplus.aigroup.asn.au www.mskills.com.au

HEAVY MACHINERY & EQUIPMENT

ENGINEERING FABRICATION



Would you like to program and operate computer controlled equipment to fabricate sheetmetal components or use specialised welding processes to fabricate structures from heavy gauge steel, plate and pipe?

As an Engineering Fabricator in the heavy engineering industry you will manufacture, assemble, modify and repair large metal structures such as bridge girders, railway carriages, vehicle chassis, pressure vessels and pipes, wheat silos or ships and shipping containers. You'll be involved in structural steel erection, sheetmetal work, boilermaking and blacksmithing. You will learn about quality control techniques and occupational health and safety.

You can work in companies that specialise in heavy engineering, using detailed specifications to fabricate parts, sub-assemblies and complete structures.



Adelaide Festival Centre Scenery and Construction Workshops engineer and construct sets, supporting technology and automation and control systems for productions on any scale such as 'We Will Rock You', 'Lion King', 'Mamma Mia' and 'Cats'.

They employ engineering drafts people, computer software specialists and engineers and are recognised internationally as the foremost theatre construction facility in the Southern Hemisphere.

SHOW STOPPER

Fabrication is highly skilled work and involves many precision skills. There are many opportunities at a technical or professional level as well.

The skills you learn by working on heavy machinery could also see you moving across to work in related industries such as Light Fabrication, Aerospace and Automotive.

Relevant qualifications that could lead to a job in this area are to be found in the Metal and Engineering Training Package ([see the Qualifications InfoSheet](#)).



manufacturing. alive.

www.makeit.net.au www.zoomplus.aigroup.asn.au www.mskills.com.au

HEAVY MACHINERY & EQUIPMENT

ENGINEERING MAINTENANCE



Without Maintenance personnel to maintain machinery and repair it quickly in the event of breakdowns, manufacturing plants could not function efficiently and mobile plant and equipment could not operate in often harsh environments. You could be one of these specialists, the 'trouble-shooters' who keep the wheels of industry turning.

Manufacturing plants employ Maintenance Fitters for preventative maintenance and repair of plant machinery, mechanical drives and assemblies. Electrical and Electronic Fitters fix and maintain switchboards, electrical motors and control systems.

After you gain experience, you can become a team leader, supervising workers to ensure they follow procedures and maintenance schedules. You can gain skills in purchasing, scheduling, computer aided design, supplier evaluation and non-destructive testing.



Australia spends around \$13 billion on monitoring, removing and preventing corrosion. CSIRO have designed an array of mini sensors that will monitor corrosion, and indicate where, when and why it occurs. They convert this information to a real-time management tool that can reduce maintenance and inspection costs and improve the safety and integrity of structures.

CSIRO researcher Dr Tim Muster says the day may come when there are sensors that can initiate self-repair once corrosion is detected.

RUST NEVER SLEEPS

If you go on to become a Maintenance Engineer, you will plan, direct and coordinate the design, modification and continued performance of equipment and machinery. The skills you learn in working on heavy machinery could also see you moving across to work in related industries such as Light Fabrication, Aerospace and Automotive.

Relevant qualifications that could lead to a job in this area are to be found in the Metal and Engineering Training Package ([see the Qualifications InfoSheet](#)).



manufacturing. alive.

www.makeit.net.au www.zoomplus.aigroup.asn.au www.mskills.com.au

HEAVY MACHINERY & EQUIPMENT SURFACE FINISHING



The final step in the production of metal articles and components is to provide them with a specialised finish.

As a Surface Finisher in the heavy engineering industry, you will treat and coat the surface of components and products using a number of different electrolytic and organic processes. These can include electroplating, galvanising, anodising, powder coating and industrial spray painting. You will learn how to pre-treat surfaces using mechanical and chemical processes so that they are ready to be coated with a variety of finishes.

Some surface coatings may be purely decorative, but in heavy engineering they usually provide super-accurate engineering finishes, for example on hydraulic shafts, or they provide protection against oxidation and corrosion.

You can work as an Electroplater, coating parts and products with a fine layer of metals such as copper, silver, nickel or chromium.



In 1946, Lance Hill created a rotary clothesline that was to become a cultural icon and an emblem of Australian enterprise, the Hills Hoist.

In 1994 Hills sold its 5 millionth Hills Hoist and in 1996 celebrated 50 years of operation. Today Hills employs over 2000 people.

The Hills Hoist was chosen as the promotion and marketing symbol for the 1996 Adelaide Festival of Arts and it also featured in the closing ceremony of the Sydney 2000 Olympic Games.

SPIN

Alternatively you can work as an industrial painter, where you will learn to use wet spraying and dry powder coating techniques. The reward for your work is knowing your products are protected from the elements and look great, and the skills you gain are in high demand across a wide range of manufacturing sectors.

Relevant qualifications that could lead to a job in this area are to be found in the Metal and Engineering Training Package ([see the Qualifications InfoSheet](#)).



manufacturing. alive.