



WTIA Welding Technology Institute of Australia
Research, Education, Technical Support & Information

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Welding & Fabrication of Quenched and Tempered Steel

The National Diffusion Networks Project is supported by
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Core Partner of the
Cooperative Research Centre
for Welded Structures



Welding Technology Institute of Australia

The Welding Technology Institute of Australia (WTIA) is the recognised national Australian Body representing the overall interests of the “welding” industry, with its primary goal to: “assist in making Australian Industry locally and globally competitive in welding-related activities”. The Goal and Strategies within its Business Plan cover the ‘Total Life Cycle of Welded Products/Structures’.

The WTIA is a membership based, cooperative, not-for-profit, national organisation representing the Australian welding industry and is registered as a ‘Company Limited by Guarantee’ under the Australian Corporations Law. WTIA is governed by a Council elected by the Divisions and Corporate Members.

Formed in 1989 through an amalgamation of the Australian Welding Institute (AWI) (founded 1929) and the Australian Welding Research Association (AWRA) (founded 1964), its key roles have been, and still are, predominantly in technology transfer, certification of personnel, education and training, provision of technical services and facilitating research and development.

Through its Council, Boards and Industry Support Groups, and Technical Panels it has representation from a tremendous range of industry, government authorities and educational institutions both locally and internationally.

Membership is offered within various categories and professional levels, presently consisting of approximately 1,400 individual members and 300 company members, whose annual subscriptions provide a significant portion of the operating costs of the organisation.

The current staff of 22 includes 13 engineer/technologists with a variety of specialist backgrounds in welding technology. This expertise is complemented by Industry Support (SMART and Technology Expert) Groups and Technical Panels with over 300 technical specialists, and by a number of WTIA voluntary Divisional Bodies in all States and Territories. Together they contribute on a significant scale to Australian Industry through its excellent network of volunteers throughout Australia and the wide cross-section of its membership from MD to welder.

The WTIA provides a very wide range of services to industry across Australia, Government and individual members. It is the body representing Australia on the International Institute of Welding, is a Core Partner of the CRC for Welded Structures, and it has a number of MOUs with kindred local and overseas bodies. It is actively involved in numerous initiatives to assist in improving the competitiveness of Australian Industry.

WTIA National Diffusion Networks Project, SMART TechNet Project and OzWeld Technology Support Centres Network

Welding technology in the broadest sense plays a major role in Australia’s well-being and is utilised by over 20,000 Australian businesses large and small with over 300,000 employees. The Welding Technology Institute of Australia (WTIA) is a significant player with industry in promoting improvements in industry through optimum use of Technology.

The Federal Industry Minister, Ian Macfarlane, announced that the WTIA has received a \$2.45m grant from the AusIndustry Innovation Access Program (IAccP) – Industry. The Institute launched its new Industry Sectoral Projects (ISPs) from 1 September 2003 as part of the WTIA National Diffusion Networks Project. The Projects involve the implementation of a structured welding and joining technology demonstration and improvement program in seven Australian industry sectors over three years (2003-2006).

The sectoral strategy involves the WTIA working directly with leading Australian firms, SMEs, supply chains and technology specialists in the OzWeld Technology Support Centres (TSCs) Network to help them:

- analyse and define the key challenges, opportunities and requirements that will govern the competitiveness of Australia’s capability in each sector and identify specific areas where welding, joining and fabrication innovation and technology needs to be upgraded and transferred to improve both their own and Australia’s competitive advantage and market performance in that sector;
- demonstrate project activities and identify how the solutions can be implemented, document the activities of the demonstration projects and outcomes, disseminate activities to the wider industry and plan activities for future actions needed, including research, development, education, training, qualification and certification.
- document key Expert Technology Tools and Technical Guidance Notes for each technology/sector application and facilitate the ongoing uptake, tailored application and skills development in each of the welding/joining/fabrication technologies identified through the program.

The new industry sectors to be tackled include **rail, road transport, water, pressure equipment, building & construction, mining and defence.**

The new NDNP will also act as an umbrella encompassing the two other projects for which we previously received substantial Federal Government, State Government and industry funding. The OzWeld Technology Support Centres Network will continue to support solutions to meet the needs of industry and will be expanded to 35 local and 20 overseas TSCs, all contributing appropriate and leading-edge technologies to assist all industry sectors.

The SMART TechNet Project, with its SMART Industry Groups and Industry Specific Groups (ISGs) already running in the Power Generation, Petro/Chemical, Pipelines, Alumina Processing, Inspection & Testing and Fabrication industries will continue in parallel with the new Project, with potential for interesting “cross pollination” with groups for the new Industry Sectoral Projects (ISPs) and SMART Groups.

Major benefits from this Project are overall improvement and competitiveness of Australian industry through the use of latest proven technology, economically diffused by a greatly improved network, as well as improved and expanded services to sponsor companies. The Project is believed to be the major practical strategy for rapid improvement of our “welding” businesses. The returns on investment for all parties on the WTIA OzWeld Technology Support Centres Project and SMART TechNet Project have been enormous. The return on this new National Diffusion Networks Project is expected to be even higher for parties involved.

EXPERT TECHNOLOGY TOOLS for the Welding Industry

What are they?

An Expert Technology Tool (ETT) is a medium for diffusion and take-up of technological information based on global research and development (R&D) and experience to improve industry performance.

It can be formatted as a hard copy, software (fixed, interactive or modifiable), audiovisual (videos and sound tapes) or physical samples. It can be complemented by face-to-face interaction, on-site and remote assistance, training modules and auditing programs.

The diagram overleaf and the information below show how the WTIA has introduced a group of ETTs to help companies improve their performance.

ETT's and the SME – how can they help my Total Welding Management System?

A Total Welding Management System (TWMS) is a major ETT with supporting ETTs created specifically to assist Australian industry, particularly those Small to Medium Enterprises (SMEs) that do not have the time or finance to develop an in-house system. These companies, however, are still bound by legal requirements for compliance in many areas such as OHS&R, either due to government regulation or to contract requirements. The TWMS developed by the WTIA can be tailor-made by SMEs to suit any size and scope of operation, and implemented in full or in part as required.

What is Total Welding Management

Total Welding Management comprises all of the elements shown in the left-hand column of the table shown overleaf. Each of these elements needs to be addressed within any company, large or small, undertaking welding, which wishes to operate efficiently and be competitive in the Australian and overseas markets.

The Total Welding Management System Manual (itself an Expert Technology Tool) created by the WTIA with the assistance of industry and organisations represented within a Technology Expert Group, overviews each of these elements in the left-hand column. It details how each element relates to effective welding management, refers to supporting welding-related ETTs, or, where the subject matter is out of the range of expertise of the authors, refers the user to external sources such as accounting or legal expertise.

Knowledge Resource Bank

The other columns on the diagram overleaf list the Knowledge Resource Bank and show examples of supporting ETTs which may, or may not, be produced directly by the WTIA. The aim, however, is to assist companies to access this knowledge and to recognise the role that knowledge plays in a Total Welding Management System. These supporting ETTs may take any form, such as a Management System e.g. Occupational Health, Safety and Rehabilitation (OHS&R), a publication e.g. WTIA Technical Note, a video or a Standard through to software, a one-page guidance note or welding procedure.

Clearly, ETTs such as WTIA Technical Notes, various Standards, software, videos etc are readily available to industry.

The group of ETTs shown overleaf relate to a general welding fabricator/contractor. The ETT group can be tailor-made to suit any specific company or industry sector.

A company-specific Knowledge Resource Bank can be made by the company omitting or replacing any other ETT or Standard.

Total Welding Management for Industry Sectors

Total Welding Management Systems and the associated Knowledge Resource Banks are being developed for specific industry sectors, tailored to address the particular issues of that industry and to facilitate access to relevant resources. A company-specific Total Welding Management System can be made by the company adding, omitting or replacing any element shown in the left hand column, or ETT or Standard shown in the other columns. This approach links in with industry needs already identified by existing WTIA SMART Industry Groups in the Pipeline, Petrochemical and Power Generation sectors. Members of these groups have already highlighted the common problem of industry knowledge loss through downsizing, outsourcing and privatisation and are looking for ways to address this problem.

The concept of industry-specific Total Welding Management Systems and Knowledge Resource Banks will be extended based on the results of industry needs analyses being currently conducted. The resources within the Bank will be expanded with the help of Technology Expert Groups including WTIA Technical Panels. Information needs will be identified for the specific industry sectors, existing resources located either within Australia or overseas if otherwise unavailable, and if necessary, new resources will be created to satisfy these needs.

How to Access ETTs

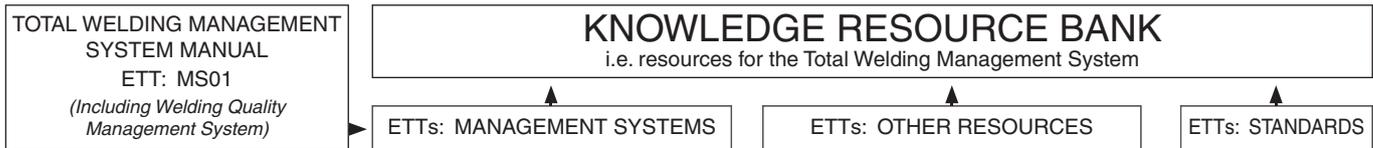
Management System ETTs, whether they are the Total Welding Management Manual (which includes the Quality Manual), OHS&R Managers Handbook, Procedures, Work Instructions, Forms and Records or Environmental Improvement System, can be accessed and implemented in a variety of ways. They can be:

- Purchased as a publication for use by industry. They may augment existing manuals, targeting the welding operation of the company, or they may be implemented from scratch by competent personnel employed by the company;
- Accessed as course notes when attending a public workshop explaining the ETT;
- Accessed as course notes when attending an in-house workshop explaining the ETT;
- Purchased within a package which includes training and on-site implementation assistance from qualified WTIA personnel;
- Accessed during face-to-face consultation;
- Downloaded from the WTIA website www.wtia.com.au

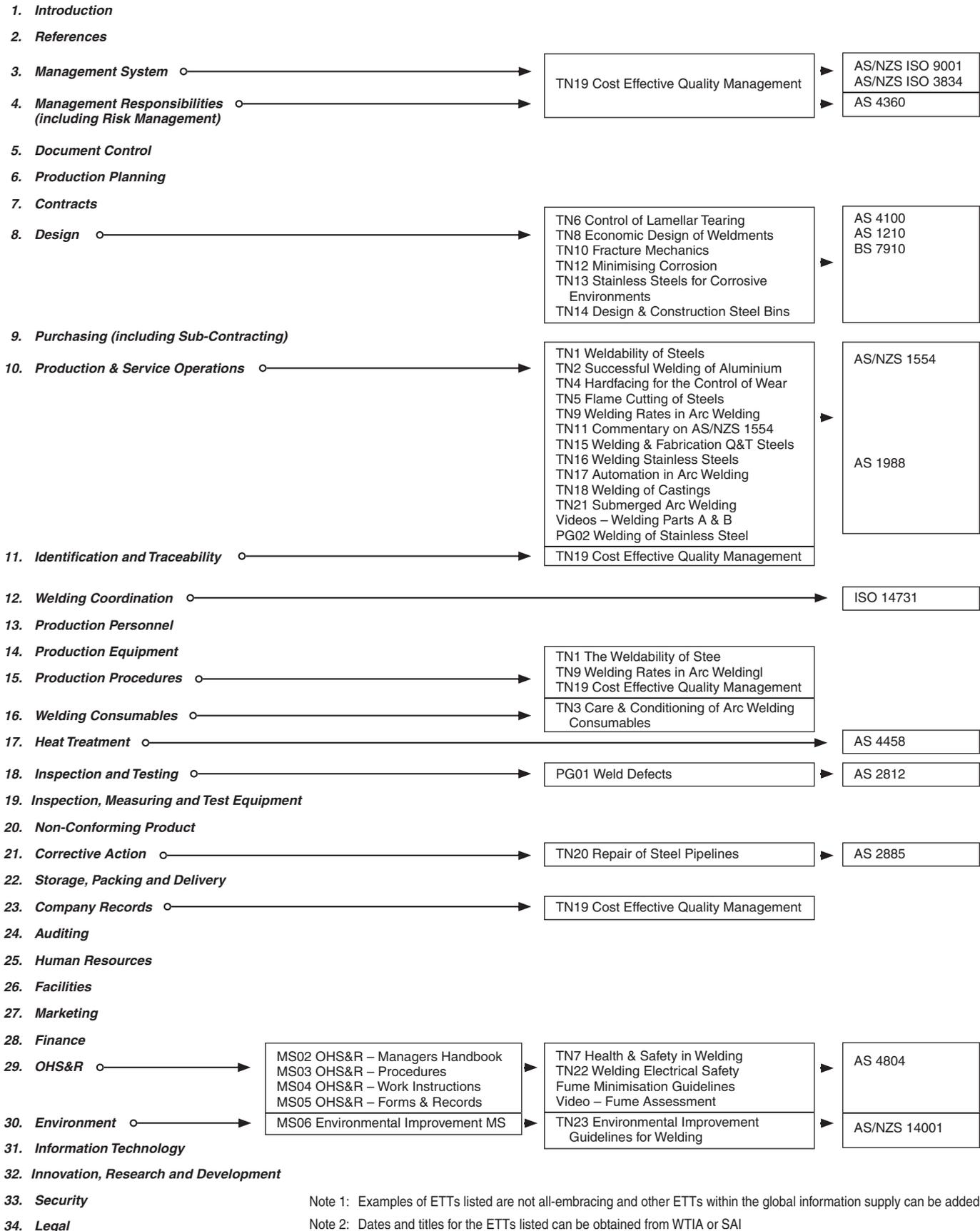
ETT's created by the WTIA are listed at the back of this Technical Note. Call the WTIA Welding Hotline on 1800 620 820 for further information.

TOTAL WELDING MANAGEMENT SYSTEM

supported by KNOWLEDGE RESOURCE BANK



ELEMENTS:



Note 1: Examples of ETTs listed are not all-embracing and other ETTs within the global information supply can be added.
 Note 2: Dates and titles for the ETTs listed can be obtained from WTIA or SAI

This Technical Note:

- Contains information relevant to the welding and fabrication of a range of quenched and tempered steels used for structural and abrasion resistant purposes;
- Is intended to assist tradesmen, supervisors, inspectors, managers and engineers in understanding such steels;
- Is designed to assist students in obtaining practical and theoretical information on quenched and tempered steels;
- Is a revision of the March 1985 edition of this technical note and has been prepared using the latest literature and information available from the industry;
- Shows various applications of quenched and tempered steels in Australia;
- Has been prepared under the direction of WTIA Technical Panel 2 *Weldability of Steel* currently consisting of:
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Mr Graham Arvidson – Department of Agriculture, Energy and Minerals
Mr Russell Barnett – Bisalloy Steels Pty Ltd
Mr Hayden Dagg – Tubemakers of Australia Ltd
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Dr Arch Vettors – TAPNAL

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Future Revisions

This Technical Note will be revised from time to time and comments aimed at improving its value to industry will be welcome. No extracts from this publication may be printed or published in any form without the WTIA's permission.

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Should expert assistance be required, the services of a competent professional person shall be sought.

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