OZWELD

EXPERT TECHNOLOGY TOOLS

Welding Technology Institute of Australia

Research, Education, Technical Support & Information

WTIA Technical Note No. 22

Welding Electrical Safety

The SMART TechNet Project has been supported by Federal and State Governments and Australian industry

AUSTRALIA AusIndustry™

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

Published by the Welding Technology Institute of Australia

Editors:
Mr Glen Allan
State Technology Manager Regional NSW
Prof Ian Henderson
State Technology Manager WA
Ms Anne Rorke
WTIA Technology Transfer Coordinator
Mr Bushan Salunke
WTIA Expert Technology Tool Coordinator

WTIA
ABN 69 003 696 526
Unit 3, Suite 2 9 Parramatta Road
Lidcombe NSW 2141
PO Box 6165
Silverwater NSW 1811
Tel: +61 (0)2 9748 4443
Fax: +61 (0)2 9748 2858
Email: info@wtia.com.au
Website: www.wtia.com.au

Executive Director – Chris Smallbone
President – Pat Kenna

Honorary Secretaries
New South Wales: Allan Brew,
1 Hunter Way, Faulconbridge NSW 2776
Tel: (02) 0412 613 636;
Queensland: Grahame Clayworth,
PO Box 744, Archerfield Qld 4108
Tel: (07) 3810 8728;
Western Australia: Mary Forward,
PO Box 123, Kelmscott, WA 6991
Tel: (08) 9496 0926;
South Australia: Pat Johnstone,
PO Box 133, Hove SA 5048 Tel: (08) 8377 3181;
Victoria & Tasmania: Brian Hamilton, PO Box 204, Mooroolbark Vic 3128 Tel: (03) 9726 0500.

WTIA Technology Managers

New South Wales & ACT:
Paul Grace; Tel: (02) 9748 4443;
Regional New South Wales:
Glen Allan Tel: (02) 4935 5445;
Queensland:
Leon Rosenbrock Tel: (07) 3364 0770;
Northern Territory:
Steve Thring Tel: (08) 8946 6431;
Western Australia:
Ian Henderson Tel: (08) 9368 4104;
Regional Western Australia:
Geoff Hall Tel: (08) 9599 8614;
South Australia:
Greg Terrell Tel: (08) 8300 1559;
Victoria & Tasmania:
Alan Bishop Tel: (03) 9214 5052.

CRC-WS
Core Partner of the Cooperative Research Centre for Welded Structures

OZWELD

EXPERT TECHNOLOGY TOOLS

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 24 includes 14 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.

SMART TechNet Project

This Expert Technology Tool was a product of the very successful SMART TechNet Project started 1 June 2000. 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 WTIA is a significant player with industry in promoting improvements in industry through optimum use of Technology.

To ensure industries employing this technology are competitive globally, we all must become smarter. The WTIA SMART TechNet Project did this by:

a) covering the *total life cycle* of welded products/structures i.e. a holistic approach to avoid critical gaps in technology and practice.
b) utilising *new* industry sectors (*SMART Groups*) to help identify problems and industry, Federal, State, Territory and Regional needs, to prioritise these needs, and to provide support, guidance and information for optimum solutions. (SMART is an acronym for *S*ave *M*oney *A*nd *R*e-engineer with *T*echnology).
c) using *new Technology Expert Groups*, interfacing at company/on site level, who will extract and consolidate local and global knowledge (from R&D, practice, and experience) into a form, which is available and diffusible to industry through *'Expert Technology Tools'*. This is currently a major priority particularly for SMEs.
d) absorbing and improving the current successful WTIA *OzWeld TSC Network* by expansion with overseas and other centres for latest information and by utilising training centres, at company and SME level to assist in its efficient diffusion and application.

The overall cost of this three-year project was $10.50m with $7.00m provided by State bodies, industry and WTIA earned income and $3.50m from a Federal Government grant. The financial grant agreed by the Department of Industry, Science and Resources (DISR) Technology Diffusion Program required this other support and enable the complete network to be firmly established within the three years. The Project represents an ideal example of Industry, State and Territory Governments and Federal Government working in a team effort for the overall benefit of Australia. It gave enormous leverage of upto 700 to 1 for each sponsor's financial contribution, the benefits of which are passed on to the sponsors.

The project has 29 local and 7 overseas Technology Support Centres and 69 company sponsors from a wide variety of industries. These numbers are continually increasing.

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 return on investment for all parties on the WTIA OzWeld Technology Support Centres Project has been enormous. The return on the SMART TechNet Project was over 12:1 for all 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.

ETTs 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.

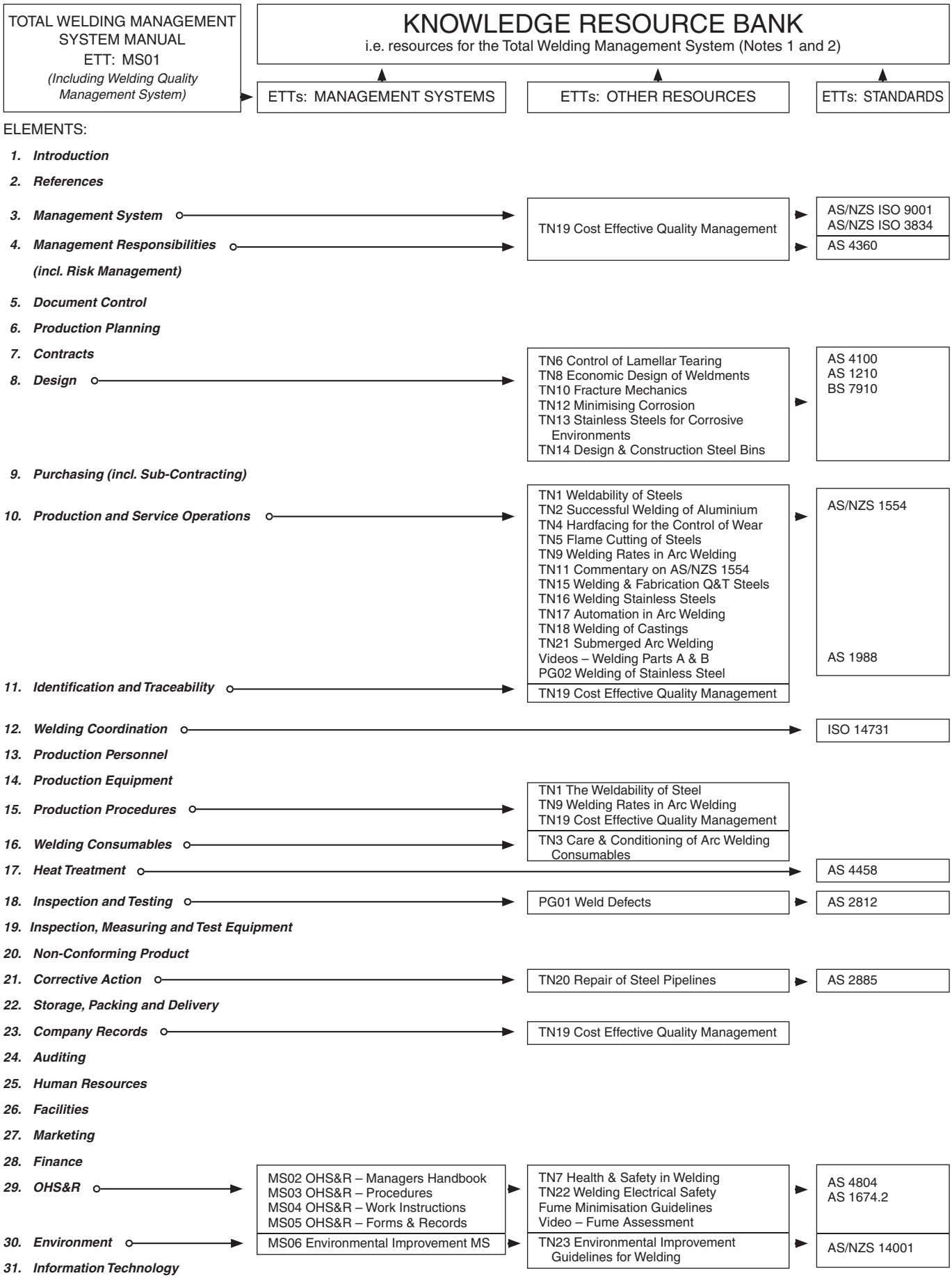
How to Access ETTs

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

ETTs created by the WTIA are listed on page 37 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



Note 1: Examples of ETTS listed are not all-embracing and other ETTs within the global information supply can be added. ETTs can be formatted in a range of media.

Note 2: Dates and titles for the ETTs listed can be obtained from WTIA or SAI.

This Technical Note:

This Technical Note is an Expert Technology Tool developed as part of the very successful SMART TechNet Project, supported by industry and Federal, State and Territory Governments. It was developed in response to a recent series of electrical safety incidents in the welding and fabrication industries. It is designed to provide practical guidance and a summary of the latest information available from a wide range of research and experience, with the goal of helping to prevent such incidents. It was prepared by WTIA under direction of WTIA Technical Panel 9 *Occupational Health and Safety and Environment*.

Acknowlegments

WTIA wishes to also acknowledge the contribution of all its members, members of WTIA Technical Panels and Committees, WTIA SMART Groups and all those in industry who have contributed in various ways to the development of this Expert Technology Tool including Mr Chris Smallbone and Mr Stan Ambrose (OAM) of WTIA for the initial concept and critical review.

Particular acknowledgment is given to the input from members of the Technology Expert Group formed from industry, government and other organisations. Members of the Technology Expert Group include:

Mr Bruce Cannon – BHP Steel – Flat Products

Mr Bob Cunningham – BHP Steel – Flat Products

Mr Ian Dick – Retired

Mr John Gate – SafetyPro Services (Gate-Leven Pty Ltd)

Mr Kevin Huckstepp – Welding Industries of Australia

Mr John Taylor – Qualmet Services Pty Ltd

Mr John Waudby – NSW Dept of Mineral Resources, Mine Safety and Environment

Mr Neil Wickham – Lightning Welding and Electrical

The Technical Note is a revision of the 2002 first edition. It will be revised from time to time and comments aimed at improving it will be welcomed.

Disclaimer

While every effort has been made and all reasonable care taken to ensure the accuracy of the material contained herein, the authors, editors and publishers of this publication shall not be held to be liable or responsible in any way whatsoever and expressly disclaim any liability or responsibility for any injury or loss of life, any loss or damage costs or expenses, howsoever incurred by any person whether the purchaser of this work or otherwise including but without in any way limiting any loss or damage costs or expenses incurred as a result of or in connection with the reliance whether whole or partial by any person as aforesaid upon any part of the contents of this Expert Technology Tool (ETT).

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

National Library of Australia card number and ISBN 1-920761-07-1

Contents

Contents