INTERNATIONAL INSTITUTE OF WELDING

A world of joining experience

Technical WORKING UNITS

A WORLD
of Joining Experience

The International Institute of Welding is a universal reference, recognized as the largest worldwide network for welding and allied joining technologies, boasting a current membership of 57 countries from five continents.

The IIW's Mission is to operate as the global body for the science and application of joining technology, providing a forum for networking and knowledge exchange among scientists, researchers and industry.

IIW International Education, Training Qualification and Certification Systems for Welding Personnel and Companies are recognized worldwide and supported by industry and by international training and accreditation entities, paving the way towards one Global Education and Qualification System for Welding Personnel.

The IIW is one of the world's three official international Standardizing Bodies in the areas of welding and joining.

IIW's virtual library constitutes the world´s largest online resource for welding information available today. The most outstanding papers are published in the prestigious journal "Welding in the World," registered in Thomson Reuters Science Citation Index®, since 2009.

WHY
join the IIW family ?

To take part in advancing innovation in the field of materials joining and to contribute to technology transfer.

To address key issues by joining one of the numerous IIW working units together with other dedicated engineers, researchers, professors and students, as well as the industrial decision-makers, doctors, architects and toxicologists who contribute their knowledge and experience to our research.

To benefit from participation at the various IIW events which reunite the international materials joining fraternity.

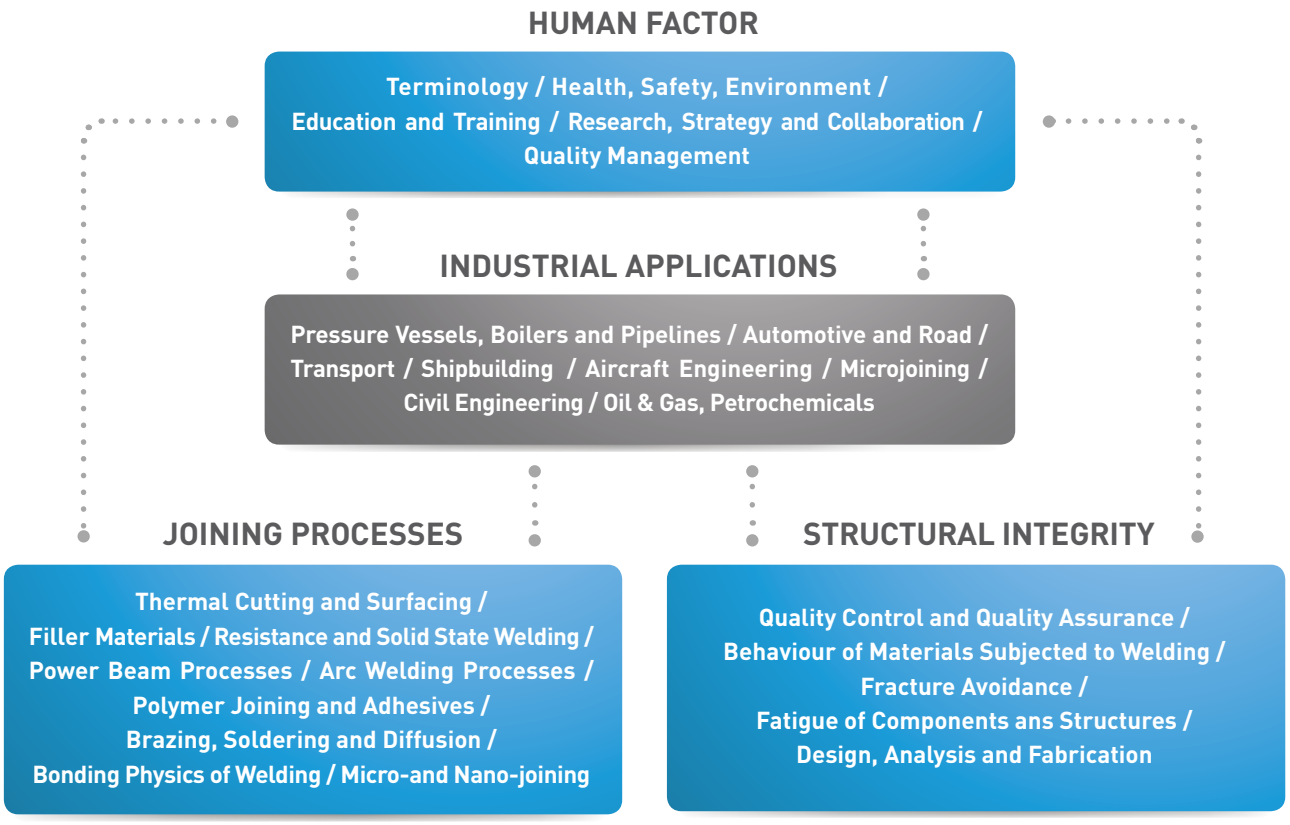
To enhance your personal and professional network at a global level.

To boost your career through publication in a top-rated scientific journal referenced in Web of Science®.

TECHNICAL COMMISSIONS AND WORKING UNITS

In order to develop world-leading products, industries must be able to integrate expertise in many fields of materials joining. Focus areas of the 23 Technical Working Units can generally be divided into Processes, Structural Integrity and Industrial Applications, and Human Factors.

One of the tremendous strengths of the IIW is the seamless cooperation between Units with different focus areas.



The IIW's Technical Working Units operate as "think tanks" and engines for technical progress for scientists, engineering and other specialist personnel involved in the research, development and application of materials joining technologies.

This strong network of experts features engineers and academics from **major universities and research institutes worldwide,** as well as top R&D personnel and executives from leading global companies.

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Within the IIW framework, the world's finest minds exchange their know-how and experience, as they discuss and present about the latest technical innovations and pioneering advances.

The best papers presented during the working sessions are published in the IIW's flagship peer-reviewed journal, *Welding in the World*, registered in the prestigious Thomson-Reuters Science Citation Index®.

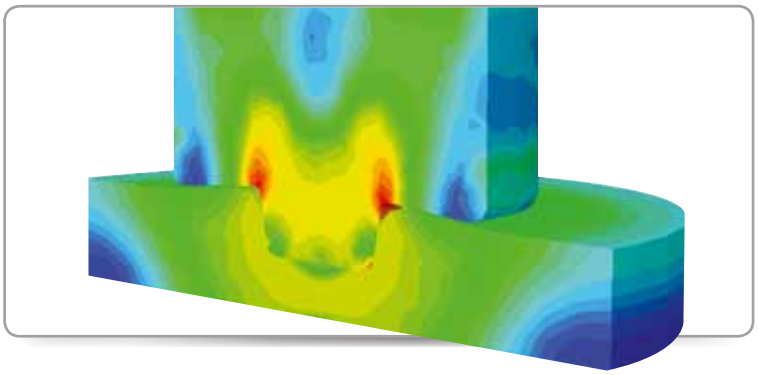
These specialists also collaborate to develop Recommendations, Guidelines, Best Practices and ISO Standards, to **improve the global quality of life** through optimum use of welding and allied technologies.

The Technical Working Units examine all key aspects of materials joining that are of prime relevance to industry.

The extensive work programmes address all significant on-going issues and current "hot topics" to **ensure the efficient transfer of knowledge and solutions to industry.**

Apart from current developments in various joining processes, the diverse focus areas include fitness-for-service, health and safety, metallurgy, weldability, inspection, NDT, design, repair and life extension, fracture mechanics, quality control and standardization.

Industrial sectors which benefit directly from IIW's knowledge transfer include shipbuilding, air and rail transportation, construction and infrastructure, wind/nuclear energy, oil and gas, automotive, steel production, consumables, mechanical engineering and process equipment among others.



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TECHNICAL COMMISSIONS AND WORKING UNITS

PROCESSES

Commission I

"THERMAL CUTTING AND SURFACING" deals with:

- Thermal cutting and allied processes (e.g. thermal spraying);
- Process modelling, mechanical properties of the end-products and production planning;
- Monitoring of advanced thermal cutting and thermal spraying equipment
- Laser cutting, especially fibre laser and remote laser cutting.

Commission II

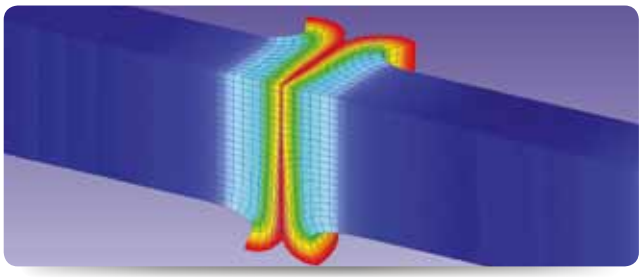
"ARC WELDING AND FILLER METALS" deals with:

- Metallurgy of the weld metal, testing and measurement of welds;
- Standardization of welding consumables, incl. testing standards and conducting round-robin tests.

Commission III

"RESISTANCE WELDING, SOLID STATE WELDING AND ALLIED JOINING PROCESSES" deals with:

- Joining of dissimilar thin sheet materials, joining in automotive industries, simulation of joining processes and friction stir welding, incl. modelling and weldability;
- Formulation and preparation of International Standards, incl. health and environmental aspects.



Commission IV

"POWER BEAM PROCESSES" deals with:

- Power beam processing technologies, incl. laser, laser-hybrid and electron beam welding;
- New processes, process modelling, mechanical properties of end-products and environmental health / safety;
- Application of power beam processes to novel and otherwise difficult-to-weld materials

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Commission XII

"ARC WELDING PROCESSES AND PRODUCTION SYSTEMS" deals with:

- Sensors and process control, advanced process and underwater welding, production systems and applications, quality control and safety of arc processes;
- Establishing more reliable welding and joining technologies with higher productivities through a deep understanding of the physical phenomena governing arc welding processes (with Study Group-212).

Commission XVI

"POLYMER JOINING AND ADHESIVE TECHNOLOGY" deals with:

- Series production requiring high automation levels;
- Polymer joining and adhesive technology with modern hybrid materials and fibre-reinforced plastics.

Commission XVII

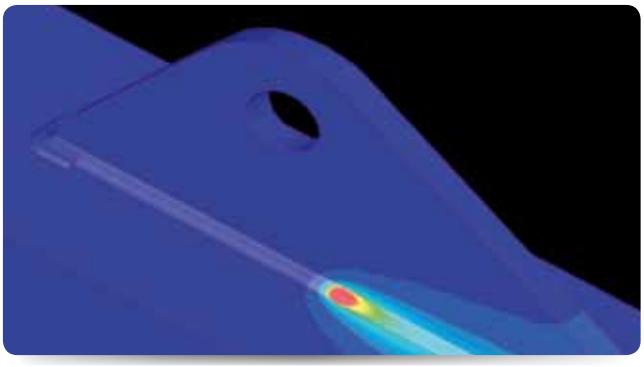
"BRAZING, SOLDERING, AND DIFFUSION BONDING" deals with:

- Applications of vacuum-brazed and diffusion-bonded joints;
- The metallurgical and mechanical properties of brazed, soldered or diffusion bonded materials, incl. NDT and testing methods;
- Development and evaluation of new filler materials.

SG-212

STUDY GROUP "PHYSICS OF WELDING" deals with:

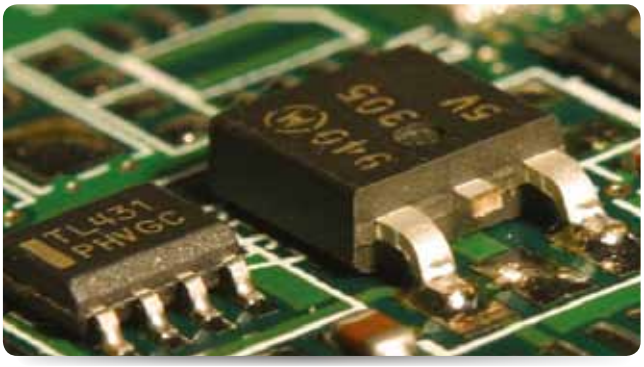
- The understanding of the welding arc, metal transfer and weld pool;
- Mechanisms of fusion welding, with the aim of controlling and improving weld quality and productivity;
- Experimentation and modelling, comprehension of boundary phenomena across the arc;
- Development of useful simulation software for digital manufacturing.



SC-MICRO

SELECT COMMITTEE MICROJOINING deals with:

- Processes of microjoining and nanojoining as applied to applications such as MEMS and NEMS, medical implants;
- Materials (nanoparticles, nanolayers, etc.) used in microjoining and nanojoining;
- Methods and equipment used for quality assessment (both destructive and non-destructive) of micro-and nano-scale joints; and
- Fundamental issues in microjoining and nanojoining, such as nano-effects.



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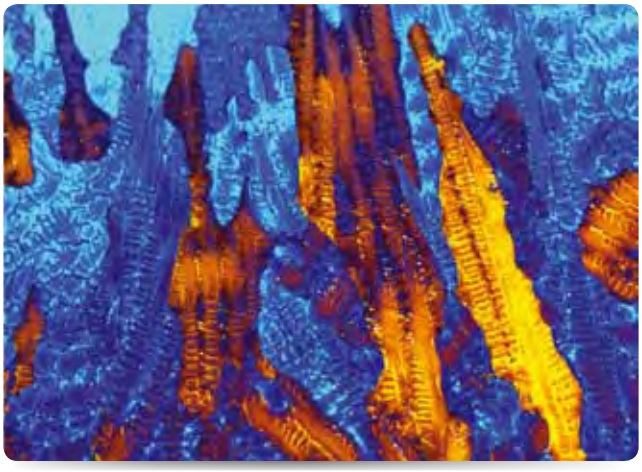
TECHNICAL COMMISSIONS AND WORKING UNITS

STRUCTURAL INTEGRITY

Commission V

"NONDESTRUCTIVE TESTING AND QUALITY ASSURANCE OF WELDED PRODUCTS" deals with:

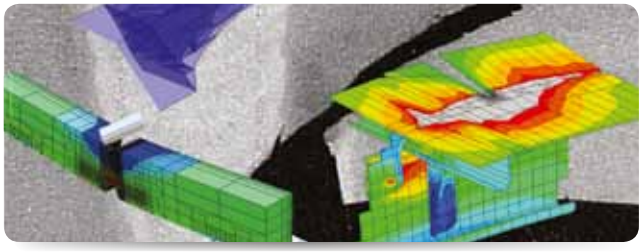
- Radiographic weld inspection including digital techniques, reference radiographs and standardization;
- Ultrasonic weld inspection including IIW Handbooks, phased array focusing techniques and standardization;
- Weld inspection based on electric, magnetic and optical techniques including MMM standardization;
- NDT reliability and simulation including IIW Booklet on using simulation for probability of detection studies.



Commission IX

"BEHAVIOUR OF METALS SUBJECTED TO WELDING" deals with:

- Welding metallurgy of low alloy steels, stainless steels, Ni-base alloys, creep resisting steels and non-ferrous alloys, covering the microstructure, properties and performance of welded joints;
- The influence of welding on the integrity of welded joints and components in service;
- The occurrence of defects and avoidance of failure and in-service damage (hot and cold cracking, fatigue, creep and corrosion);
- Mathematical modeling of weld phenomena.



Commission X

"STRUCTURAL PERFORMANCE OF WELDED JOINTS FRACTURE AVOIDANCE" deals with:

- Establishing procedures for assessing the strength and integrity of welded structures in design as well as in service, with attention to residual stresses, strength mismatch and toughness inhomogeneity in welds.
- The development of a practical guideline for Fitness-for-Service (FFS) assessment for welded components. C-X FFS focuses on specific subjects not covered by existing standards/guidelines.

Commission XI

"PRESSURE VESSELS, BOILERS AND PIPELINES" deals with:

- Aspects of pressure vessels and pipelines that can be impacted by welding throughout their life cycle;
- Application of other IIW WUs' work toward design, fabrication, life prediction and failure prevention of components, vessels and pipelines.

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Commission XIII

"FATIGUE OF WELDED COMPONENTS AND STRUCTURES" deals with:

- Innovative technologies to avoid fatigue failures in welded structures;
- Development of widely recognized guidelines applicable to challenging design and life extension cases;
- Development of "IIW Guidelines on Weld Quality in Relationship to Fatigue Strength" with SC-QUAL;
- Preparation of guidelines for post-weld fatigue strength improvement of welded structures.

Commission XV

"DESIGN, ANALYSIS AND FABRICATION OF WELDED STRUCTURES" deals with:

- Design guidelines, fabrication quality, weld joint preparation standards, structural repair, optimization and economy factors in design/fabrication;
- Preparation of ISO standards for welded joints in tubular structures;
- Possible harmonization of national standards for welded structures;
- Analysis, design, fabrication, planar structures, tubular structures, economy.

SC-AIR

SELECT COMMITTEE "PERMANENT JOINTS IN NEW MATERIALS AND COATINGS FOR AIRCRAFT ENGINEERING" deals with:

- Promoting the application of advanced welding technology in aircraft;
- Structural Integrity Assessment of aeronautical welded structures;
- Introducing Additive Manufacturing into aeronautical structures;
- Introducing Surface Engineering Technology into aeronautical structures.

SC-AUTO

SELECT COMMITTEE "AUTOMOTIVE AND ROAD TRANSPORT" deals with:

- Improving product properties and fabrication conditions in order to increase vehicle safety, while reducing the negative impact of vehicles on the environment and, lowering vehicle assembly costs;
- Providing a comprehensive overview of the activities of IIW in materials joining in the automotive industry.

SC-SHIP

SELECT COMMITTEE "SHIPBUILDING" deals with:

- Assisting shipbuilders to enhance quality, operations and productivity;
- Fostering interaction among shipbuilders, welding research, universities and welding supply and automated system specialists;
- Considering human elements in the implementation of welding technologies and advanced production systems, e.g. modern management, production organization and human resources.

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TECHNICAL COMMISSIONS AND WORKING UNITS

HUMAN ASPECTS

Commission VI

"TERMINOLOGY" deals with:

- The development, collection and maintenance of welding terminology obtained from existing international, regional and national standards;
- Making welding terminology available in print or electronic media.

Commission XIV

"EDUCATION AND TRAINING" deals with:

- Examining ways of reducing the skill shortage of welding personnel and enhancing the image of welding:
- Creating a shared platform for training resources;
- Advancing promotion of standardization and avoiding duplication, assisting new member countries and developing countries in particular.

Commission VIII

"HEALTH, SAFETY AND ENVIRONMENT" deals with:

- Creating an interdisciplinary network for exchanging knowledge on health/safety in welding:
- Regularly reviewing general trends related to the exposure to agents affecting health/safety in welding;
- Sharing information on national laws, rules and regulations;
- Developing best practices concerning health/safety in welding.

SC-QUAL

SELECT COMMITTEE "QUALITY MANAGEMENT IN WELDING AND ALLIED PROCESSES" deals with:

- Maintaining the goal to identify, create, develop and transfer global best practices in the field of quality management for welding and allied processes;
- Focusing on quality management systems and the requirements for personnel and companies involved in welding and allied processes.
- Developing guidelines on the implementation of quality standards, e.g. ISO 3834 ″Quality requirements for fusion welding of metallic materials.″

- Promoting exchange of knowledge between technical experts, quality managers and production personnel by acting as an interdisciplinary body for the IIW.

SG-RES

STUDY GROUP "WELDING RESEARCH STRATEGY AND COLLABORATION" deals with:

- Promoting collaboration between international researchers;
- Reviewing the latest trends in welding technology and new methodologies and techniques for research;
- Creating strategies (e.g. funding, identification of major projects, etc.) for establishing international research groups;
- Collecting critical feedback on how topics of industrial interest and national support for welding research are progressing.

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WHAT

can you achieve as a member ?

Under the auspices of the IIW, you can create your country's own "board of welding education" and official welding training centres.

You can issue IIW diplomas and at every level of the profession, thus recognition of their skills.

You can gain the acclaim of the community through our prestigious Delegates and experts may be units.

You can obtain access to the IIW's vast technical database, with more than 15,000 key documents from over 60 years.

The Premier International R&D Forum on Materials Joining

Over than

800 experts and delegates contributing to **92** technical working units

600 documents shared each year

A popular collaborative web platform

Number of visits **x5** since 2006

15,000 downloadable documents

3,000 registered users

Membership is open to non-profit organizations or research institutes, with the possibility of multiple members per country.

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