Training and certification for NDT and welding for Africa – a developing continent

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SAIW - In a Nutshell

- The Southern African Institute of Welding (SAIW) was founded in 1948 and is a founding member of the International Institute of Welding.
- SAIW is a non-profit technical organisation dedicated to implementing and furthering standards in welding, non destructive testing and other related technologies.
- Associate member of ICNDT.
- In 2003 SAIW formed SAIW Certification NPC to manage examination, qualification and certification for industry.
- SAIW Certification is accredited by SANAS for personnel certification.
- Appointed as the Anglophone Regional Designated Centre for NDT by AFRA in 2001.
- Based in Johannesburg with branches in Cape Town and Durban.

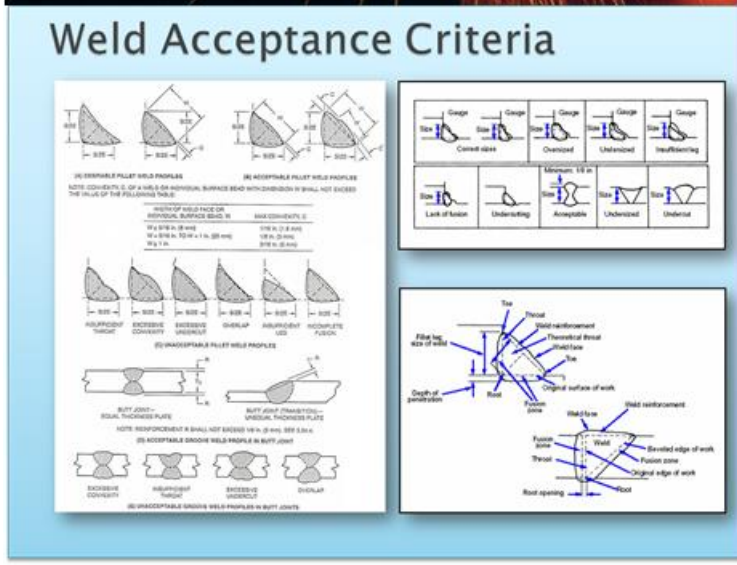
SAIW iiw SAIW Certification

SAIW: Training programmes – Welding Technology

- IIW-ANB Courses (International Institute of Welding (IIW)
  - Welding Co-ordination courses
    - IWE (University of the Witwatersrand and University of Pretoria are ATB's)
    - IWT
    - IWS
    - IWP
  - Welding Inspection
    - IWI-B; IWI-S; IWI-C
  - Practical Welding
    - International Welder

- SAIW Courses
  - Industry developed courses
    - Welding Inspectors & Senior Welding Inspectors
    - Heat treatment, Paint Inspectors, Welding & Fabrication codes

- ATB's
  - International Welder – 4 ATB's

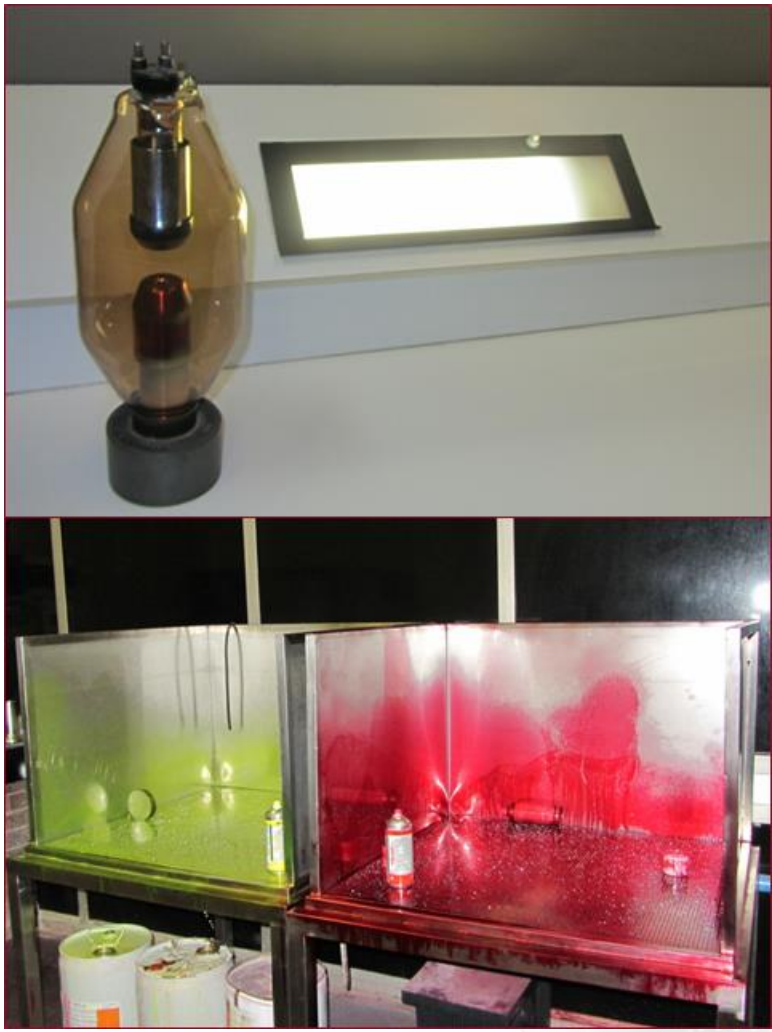


SAIW: Training programmes – NDT

- ISO 9712 NDT Courses – Levels 1, 2 and 3
  - Eddy Current Testing (ECT) ; Magnetic Testing (MT); Penetrant Testing (PT); Radiographic Testing (RT); Ultrasonic Testing(UT); Visual Testing (VT)
- Industrial Sector
  - Pre and in Service Testing
- Product Sectors
  - Casting; Forging; Wrought products; Welds; Tube and pipe
- Advance Applications (After Level 2 Certified)
  - Development Complete
    - UT 2.8 Critical Flaw sizing
    - UT 2.9 Austenitic Stainless Steel
  - Under development
    - ECT 2.5 Digital Application & signal Analysis
    - RT 2.9 Digital Radiography
    - UT 2.10 Ultrasonic Phased Array
    - UT 2.11 Ultrasonic Time of Flight Diffraction (TOFD)

Summary of NDT training and certification in South Africa

- National NDT Scheme: SAQCC
- National NDT Society: SAINT
- Professional Body: SAINT Professional Body
- Personnel Certification Body: SAIW Certification
- Authorised Qualification Body: SAQCC
- Approved Training Bodies under SAQCC Scheme:
  - Current : SAIW-NDT
  - In process : NASA-CPT SANDE
  - Showed interest : NASA-DBN ANDTC, TUV-SUD
- Signatory to ICNDT MRA Schedule 1 agreement, thus underwrites international harmonisation under ISO 9712
- (MRA Schedule 2 agreement – in process)



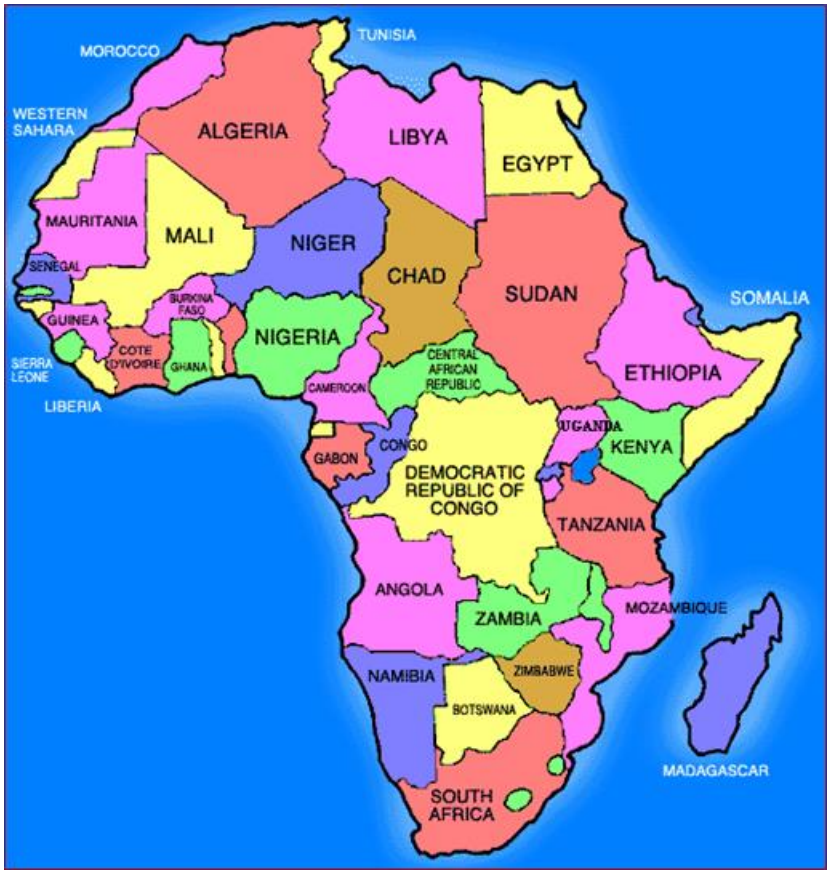
Statistics of NDT training and certification in South Africa

- Due to historical progress, three major NDT Qualification / Certification schemes operated in South Africa:
  - Third Party conformance Schemes
    - SAQCC (ISO 9712) 2577 People
    - PCN (ISO 9712) ≈ 1700 People
  - Second Party Conformance Schemes
    - ACCP ≈ 100 People
    - ASNT ≈ 1000 People
  - First / Second Party Conformance Schemes:
    - SNT-TC-1A ≈ 5000 people
- Plans to merge all three systems into a single system currently underway.
  - Basic Qualification and Personnel Certification
  - Company Specific Mentoring and Authorization
  - End User Performance Assessment and Approval
  - Continuous Development Program
- Professional Designation
  - NDT Operator (Level 1)
  - NDT Technician (Level 2)
  - NDT Technologist (Level 3)

South African Industry

- Power Generation (European Standards)
  - Eskom (95% of generation capacity in SA, 45% of generation capacity in Africa)
  - 14 coal fired power stations - 2 under construction
  - 5 gas turbine
  - Hydro-electric and pumped storage schemes, 1 under construction
  - Nuclear – 1 power station
  - Wind power
  - Solar – concentrated and PV power
- Petrochemical (American Standards)
  - 4 oil refineries, 2 gas/coal to liquids plants
  - 18% of continents capacity
- Structural Steel (American Standards)
- Aeronautical

Africa



- 54 Countries
- Rich in natural resources
  - Oil, coal, manganese, chromium, platinum
- Mining, petrochemical and power generation
- Poverty prevails
- High end skills mostly imported
- Beneficiation of minerals and resources required to unlock true potential in Africa.
- Skills shortage
- IIW Members
  - South Africa, Nigeria and Angola
  - Interest from Ghana and Cameroon

IAEA – SAIW : Success story - Summation

- Personnel Training & Certification:
  - Countries participated since 2001
    - Egypt, Kenya, Cameroon, Ethiopia, Morocco, Algeria, Libya, Sudan, Ghana, Nigeria, Congo, Angola, Zambia, Zimbabwe, Mauritius
  - 223 Level 1, 2 or 3 Candidates qualified and certified since 2001
  - 9 students completed training in May 2015 on triangular project with Cameroon and Sudan
- 8 Scientific visits were undertaken since 2001.
- Regional ATB's
  - Hydrac : Cameroon
  - SAEC : Sudan
  - KEBS : Kenya
- Regional Examination Centres
  - Difficulty in establishing sustainable regional ATB's due to the lack of practical examination resources & infrastructure – see challenges
- IAEA participation provided the foundation for establishment of the African Federation for NDT (AFNDT) one of the four regional federations of the ICNDT. (AFNDT currently has 8 full members)

Challenges for Growth in Africa

- Political and financial instability
- Lack of formal NDT infrastructure / Industry
- Logistics viz. travel, language, personnel safety
- Facility staff turnaround
- Limited Resources such as equipment and samples for training and examination

Strategy for Growth and Self-reliance of NDT in Africa

- Diffusion of knowledge from developed nations
  - Particularly advanced NDT Techniques – Eddy Current, Phased Array and Time of Flight
  - Railway sector
  - Nuclear sector
- Develop an African Qualification and Certification Scheme
  - Regional Harmonisation
  - Mutual recognition
  - High quality training
  - International Standards (ISO 9712 / ISO 17024)
  - Accreditation by IAF national member organisation
  - Minimise the need for importation of labour and skills
- Perform market survey into African countries to identify requirements and opportunities for NDT testing, service providers, relevant government department / legislation and academic institutions
- Awareness programme of International Codes and Standards
- Promote and improve AFNDT
  - Recognised ICNDT regional association
  - Algeria, Angola, Cameroon, Ghana, Kenya, South Africa, Sudan, Tunisia
  - Create awareness, through scientific visits, of the importance and need of NDT in relevant national industry sectors with specific relation to National Health and Safety legislature and international codes and standards
  - Marketing of NDT
    - Focussed marketing campaign
    - Development of promotional material
    - Target End Users and Insurance Companies
  - Improve Communication channels in the organisation
- Establish National NDT Societies in countries where required and enrol as AFNDT members