swiss safety center

EDITORIAL

Dear Readers,

Historically speaking, all human progress has been sparked and driven by the development of new materials. Entire eras have even been named after the materials used at the time, such as the copper, bronze and iron ages. Following the industrial and in particular the scientific revolution – and the research and development possibilities this brought – there was an exponential increase in new materials and the ways they could be used. For these to benefit our society, however, their quality, mechanical integrity and therefore their material safety are of the utmost importance. We are currently experiencing the digital revolution up close, which opens up new, previously unforeseen possibilities to develop innovative materials, to verify their quality efficiently and to ensure this quality in the long term.

I hope you find this article interesting and useful!

Dr. Rene Radis, IWE
Head of Materials Technology, Swiss Safety Center AG

MAIN ARTICLE

Material safety – the fundamental prerequisite for a safe society

The demands placed on materials keep on growing, with applications in more and more challenging environments and under maximum loads. It is therefore paramount to ensure the safety of the materials. There have been countless cases of insufficient material safety in the past, with sometimes catastrophic consequences. There are numerous reasons for this: ageing, incorrect construction, poor quality, maintenance neglect, etc.

Accredited test lab for materials technology quality assurance in the Swiss industry

The basis for materials technology at Swiss Safety Center AG is formed by the excellently equipped test lab which has been accredited in accordance with SN EN ISO 17025. The engineers and technicians working there analyse and test samples for numerous customers on a daily basis as part of their quality assurance and checks. This primarily involves carrying out mechanical-technological tests to measure strength and deformation characteristics, metallographic tests to characterise micro-structures, as well as analyses to determine chemical compositions.

As manufacturing processes go, welding technology is of particular importance. All welding processes must be qualified through procedure and production control tests. As an independent and accredited testing lab, Swiss Safety Center AG supports over 500 of these qualifications per year and thus contributes significantly toward the regulated construction of buildings, plants and equipment.

Swiss Safety Center AG also takes the lab to the customer

If it is not possible to take a sample for analysis in the lab because the material is firmly anchored or transportation would be too difficult, the lab will simply come to the material.

Swiss Safety Center AG has specialised in mobile measurement technology methods for many years and has a unique set of skills in this field within Switzerland and the neighbouring European regions. With specially developed expertise and custom mobile equipment, our material experts are able to explore a wide range of materials science matters in a prompt and non-destructive manner. Examples include determining chemical compositions, assessing the micro-structure of materials, measuring hardness and thus estimating strengths, as well as assessing material degradation dependent on time and/or temperature such as corrosion, creep or embrittlement (ageing).

Materials technology examinations of the construction and coatings of bridges over the river Sihl, Zurich.

Non-destructive component testing to monitor Swiss industrial, traffic and energy infrastructures

The latest developments in data processing and digitalisation have significantly increased options for non-destructive material testing in recent years. Swiss Safety Center AG has made huge investments in this field and digitised all testing methods alongside their analogue applications – e.g. X-rays – as well as establishing collaborations in the field of computer tomography. In addition, the applications of ultrasound testing and magnetic particle testing have been mechanised and automated. This reduces not just the cost of direct testing but also the costs associated with machine failure or infrastructure closures (e.g. bridges). The latter costs are usually much higher than those for the actual non-destructive testing. With their services in the field of non-destructive tests, Swiss Safety Center AG contributes significantly toward ensuring intact infrastructures with mechanical integrity across Switzerland.

Assessments

Carrying out a detailed damage analysis after a malfunction or accident is of particular importance for material safety. Two primary objectives are pursued here: clarifying who is responsible, in order to settle legal liability issues, and determining the cause to prevent similar damage in the future. In the event of accidents involving personal injury, such liability issues are generally handled in court. The assessments for determining the cause of damage and the circumstances of an accident represent the basis for legal proceedings. With years of experience in various industries, the experts at Swiss Safety Center AG develop the assessments on a materials-technology mechanistic level, both experimentally and using numerical model construction and simulation. The results of these investigations identify the physical cause behind component failures in order to ultimately determine the root cause of the damage.

In conclusion: Swiss Safety Center AG is the partner you need for all materials technology issues.

Francesca Friso, Materials Engineer, Swiss Safety Center AG

NEWS

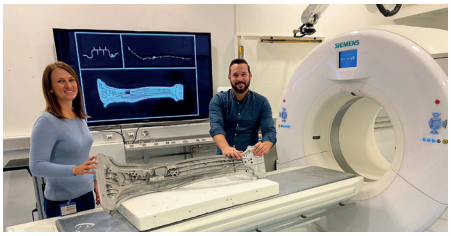
Mobile lab

Mobile material characterisation even at more than 3,000 m up

Mit umfassender Expertise im Bereich der mobilen Werkstoffcharakterisierung unterstützte die Swiss Safety Center AG das Projekt Titlis 3020 der Stararchitekten Herzog & de Meuron. Das Grossprojekt beinhaltet den Neubau der Bergstation, die Renovierung und Erweiterung des Richtstrahlturms sowie den Verbindungstunnel. Das Herzstück bildet der 50 m hohe Richtstrahlturm, eine touristische Attraktion mit einem Restaurant, einer Bar sowie einer Aussichtsplattform.

Cooperation

Cooperation with the Institute of Forensic Medicine at the University of Zurich



The Institute of Forensic Medicine at the University of Zurich is a pioneer in the field of high-resolution computer tomography. In a recently established cooperation, Swiss Safety Center AG utilises this expertise for the non-destructive examination of components to, for example, characterise deformation morphologies after accidents and compare these to the original design. The resulting findings allow conclusions to be drawn about the circumstances of an accident.

Quality assurance

For safe interim storage of radioactive fuel elements

The operation of nuclear power stations in Switzerland and particularly the decommissioning of the Mühleberg nuclear power station require the availability of a considerable number of transport and storage containers. Swiss Safety Center AG aids in the quality assurance of these key safety-related components by using tests to qualify ductile spheroidal cast iron for producing CASTOR® containers with a wall thickness of >200 mm.