

6th European Conference on standardization,
testing and certification in the field of
occupational safety and health

Be smart,

stay safe together –

Innovative products and

workplaces

12-14 June 2019 Dresden, Germany



KAN Kommission
Arbeitsschutz und
Normung
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 **EURSAFE**
European Interdisciplinary Applied Research Center for Safety

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**Rescue of persons from pressure
vessels and confined spaces**



National Conference on Confined Spaces activity, since 2011



Photo by: Adriano Paolo Bacchetta

The Association Research Organization **EURSAFE** began as a meeting point of research on the topic of prevention and safety in life, work and leisure places. The Association aims to promote, through the application of scientific methods of research, the experience of "**communities of practice**" that for years have established themselves in the world as consisting of aggregations informal "actors" who **share interests** and common issues **to work together, promote, discuss and exchange views** on issues related to the different interests of the members, **for easy dissemination of the results obtained and an increase in safety culture in any context.**

Every days we have a lot of peoples that entering Confined Spaces for their construction, maintenance and inspection.

For more of these spaces, *the access inside it's no frequent* and, for this, many site managers believe that *there are no particular reasons for concern about it.*

Working in a Confined Space holds many hazards:

- ✓ limited means of entry and exit
- ✓ poor oxygen
- ✓ presence of toxic fumes and vapors
- ✓ electrical risks
- ✓ ... and more others



Photo by: Adriano Paolo Bacchetta

that pose serious risks to workers and fatalities should happen quickly.

Fatalities in Confined Spaces happen quickly in seemingly innocuous situations: inhaling an atmosphere that contains no oxygen, causes loss of consciousness in a matter of seconds.

Often the ***hazard is not present at the time of entry***, which reinforces the need for continuous monitoring and supervision of work in Confined Spaces and half or more of all workplace Confined Space fatalities ***involve workers trying to rescue their colleagues***.

Also, in presence of flammable gas, inside Confined Spaces, may occur conditions for an explosion.



Photo by: Adriano Paolo Bacchetta

Thanks to the study conducted in a pressure equipment manufacturer, a detailed analysis has been done.

We have compared the possibility of ***relocating and increasing the manhole section***, so as to understand how they could facilitate the access / exit operations in emergency situations management.

Some considerations have also been taken on a ***possible extrication*** of a worker ***suffering from illness*** or in case of ***sudden cardiac arrest inside the equipment***.



Courtesy by: Adriano Paolo Bacchetta

We operated also for to find the needed training for rescue personnel and appropriate personal protective equipment and rescue equipment, in order to provide proper training in their use to avoid accidents, even serious ones.

These are essential keys to succeed in any rescue operation in case that workers have to entering existing pressure vessels.



Photo by: Adriano Paolo Bacchetta

German Ordinance on industrial safety and health (Betriebssicherheitsverordnung)

- §11 (2) **The employer** must ensure that employees and other persons can be immediately rescued and medically cared for in the event of an accident or emergency. This includes the provision of suitable access to and into the work equipment...



picture: R. Schubert, BG RCI

ITALIAN D.Lgs. 81/08

Art. 66 - Works in environments suspected of pollution

1. It is forbidden to allow workers access to cesspools, sewers, chimneys, pits, tunnels and in general in environments and containers, pipelines, boilers and the like, where the release of deleterious gases is possible, without having been previously ascertained the absence of danger to the life and physical integrity of the workers themselves, or without prior rehabilitation of the atmosphere by means of ventilation or other suitable means. *When there is doubt about the dangerousness of the atmosphere, workers must be tied with a safety belt, supervised for the duration of the work and, where necessary, equipped with protective equipment.*

The opening of access to these places must be large enough to allow the smooth recovery of an unconscious worker.

DGUV Rule 113-004 Work in vessels, silos and confined spaces



„5.1.1 Access openings for vessels, silos and confined spaces in which work is to be performed **must be adequately dimensioned and arranged** such that persons are able to enter and leave through them and to be rescued at any time.“

product safety

**EC (Single Market) Regulation:
Pressure Equipment Directive**

**national transposition
without changes
(full legal harmonization)**



**Harmonized
European standards**

working conditions

**EC (OS+H) Directives with
minimum requirements**

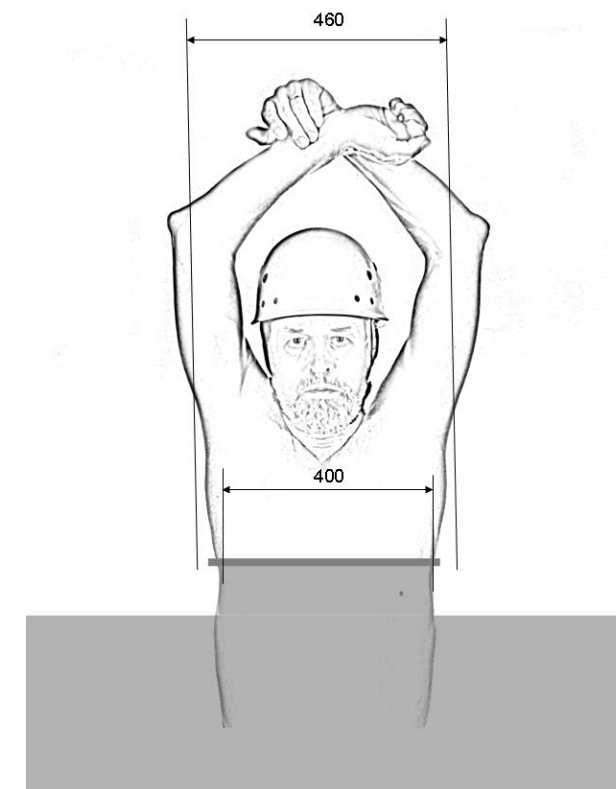
**national transposition
with the possibility of more
stringent requirements**



**national
technical rules**

The other picture

- Rescue is quite difficult with **standardized** opening dimensions of 300 mm x 400 mm or 320 x 420 mm
- KANBrief article: reactions from Italy and France
- Report in ADCO-meeting (market surveillance authorities) for EU Pressure Equipment Directive
- KAN requested revision of:
 - EN 13445-5 “Unfired pressure vessels - Part 5: Inspection and testing “
 - EN 12953-3 “Shell boilers”
 - AD-2000 A 5 “Code of practice governing openings of pressure vessel”



Source: DGUV-Fachbereich RCI

Perspectives

- **Standardization unfired pressure vessels (EN 13445)**
 - fatal accident known, rapid rescue was not possible
 - support of German associations VDMA and VCI
 - breakthrough at CEN Technical Committee meeting February 2019
- **Standardization shell boilers (EN 12953)**
 - accidents not known (really?)
 - system safety versus personal safety
 - however: own investigations on rescue
- **Involvement of further parties:** fire brigades of companies, TÜVs, international cooperation of OSH experts
- **Future:** Use of camera systems feasible? Future availability of inspection apparatus arising from Petrobot Project?

Conclusions

The extreme variety of operational situations related to Confined Spaces, ***requires much researches and sharing of experiences***, including at international level, so as to take stock of different methodological approaches and measures engineers can translate into operations and can make available at the national level to industry.

Employers need rules and guidelines that are valid in all EU member states, thus facilitating the functioning of the internal market and ***ensuring the same safety levels for workers in all EU countries***.

Waiting for future Non-Man Entry Technologies for all services, our program is to develop our researches to test more different pressure vessels, including those with internal obstacles (such as agitators, etc.), ***to find effectiveness rescue operative procedures***.

We hope that more experts will join our cooperation: ***please tell us if you or other persons are interested to collaborate with us***.

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Thank you for your
attention!