

TAA

TECHNICAL COMMITTEE FOR PLANT SAFETY

at the

Federal Ministry for the

Environment, Nature Conservation and

Nuclear Safety

Evaluation of the Experience Reports

on Safety Checks by Experts

according to Article 29a of the Federal

Immission Control Act (BImSchG) in

2003

Summary

TAA-GS-36.1-K

The German version is determining.

The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, following the recommendation made by the Technical Committee for Plant Safety (Technischer Ausschuss für Anlagensicherheit, TAA), set up a Subcommittee on Experience Reports (Unterausschuss Erfahrungsberichte, UA-EB) and commissioned it with the evaluation of the annual experience reports of the experts as provided for by Article 29a of the Federal Immission Control Act (BImSchG).

It is the purpose of the evaluation compiled in the TAA-GS-36.1 report to make use of the experience reports for the improvement of plant safety and to indicate to operators, authorities and experts where there is potential for improving plant safety. Another task of the Subcommittee on Experience Reports is the assessment of activities as of seminars or conferences on the experience exchange, which are organized by non governmental institutions, and to record the degree of participation by experts in these.

The administrative evaluation carried out by the SFK¹/TAA head office basically records whether reports are handed in in time and checks the compliance with the requirements set out in the TAA-GS-20 guidelines in terms of the format and completeness of data.

The evaluation in terms of the technical content of the experience reports was carried out by the members of the Subcommittee on Experience Reports. It includes specially the

- Identification of general conclusions regarding deficiencies in plant safety
- Identification of necessary amendments of the relevant technical rules and regulations

and provides the basis for the committee to draw up basic recommendations and conclusions.

By the end of 2004 the TAA head office had received annual experience reports based on Article 29a BImSchG for the year 2003 from 207 (75 %) of the officially accredited experts, 113 of which handed in reports on completed safety checks which as far as their presentation was concerned, largely corresponded to the TAA-GS-20 guidelines.

A total of 505 safety checks has been carried out by the accredited experts and in approximately half of the cases no major shortcomings were detected.

It was noted that the majority of reports was suited for the evaluation by the Subcommittee on Experience Reports. The most common formal error made related to missing data on the expert carrying out the check, missing or incorrect data on the check itself or missing or insufficient description of faults or missing failure coding.

¹ SFK: Störfall-Kommission, Hazardous Incidents Commission

The Subcommittee on Experience Reports takes the view that the experts should refrain from abbreviations which are not understandable for the public (p. e. for the naming of plant-components) in their Experience Reports.

About 20 % of the reports listed “conclusions for the improvement of plant safety”. However, by and large these referred specifically to the plants checked. In all other cases, where “conclusions for the improvement of plant safety” were listed, they referred to deficiencies in plant safety which would have been avoided if the relevant technical rules and regulations or equivalent other solutions had been considered in a resolute way.

Some “conclusions for the improvement of plant safety” of the experts point to a potential requirement for a further development of technical rules and regulations. This advices are not directly practicable and have to be examined and put in concrete terms. .They refer to

- standards for the production and checking of membranes / diaphragms for film-gasholders and
- single loopholes in the regulations GUV 17.4² and GUV 17.4a³

The experience reports are an important source for rating the present status of plant safety in Germany. The systematic evaluation of the experience reports helps to detect difficulties in the application of the relevant technical regulations, to identify possible needs for additional regulations and to give recommendations for the further development of plant safety.

Conclusions / Advices of the Subcommittee on Experience Reports

The evaluation of the 2003 experience reports identifies the following information about conclusions which are to be forwarded to the competent authorities of the Federal Republic and to the German Federation of institutions for statutory accident insurance and prevention (Hauptverband der gewerblichen Berufsgenossenschaften, HVBG). It is pointed out that this conclusions and advices based on different numbers of nominations.

- In the case of biogas plants problems occurred with the implementation of the technical regulations and in particular with those relating to fire and explosion prevention and electrical installations.
- Shortcomings were detected in NH₃-refrigerating plants with respect to the implementation of the technical regulations (planning, technical layout, updating of documentation) and with respect to insufficient or missing

² GUV 17.4: now GUV-R127 “Disposals”

³ GUV 17.4: now GUV-I 842 “Collection of example measures affecting explosion protection

specification tests or documentation.⁴

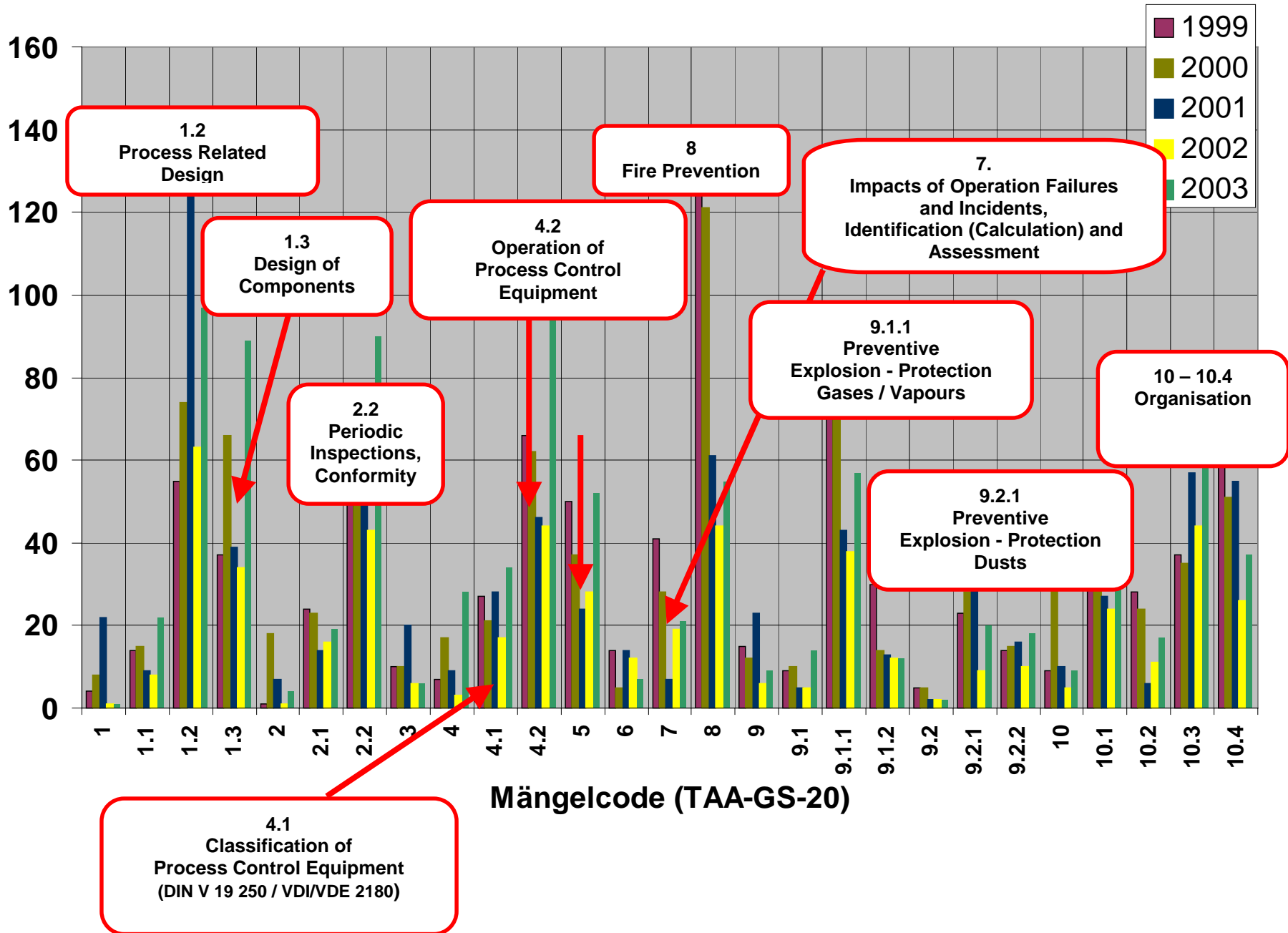
- Regulations for storages had not been considered.
- The requirement for a safe release from pressure relief devices had often not been put into practice in a consistent manner.
- Pressure relief devices and pressure relief areas were not adequate dimensioned, unsuitable or inexistent.
- Periodic inspections of safety instrumented systems were not carried out.
- There were no periodic inspections according to the Safety of Equipment Act (GSG), replaced by the Safety of Equipment and Product Act (GPSG).
- The classification of or the requirements relating to safety instrumented systems were insufficiently considered in particular in small and medium-sized enterprises (ref. to VDI/VDE 2180).
- Detection and alarm units for hazardous gases were not adequate dimensioned or inexistent.
- Development, testing and administration of user software for the safe management of programmable control units did not comply with VDI/VDE 2180 sheet 5.
- Systematic hazard analysis were inadequate, deficient or inexistent.
- Safety related characteristics of compounds were inadequately determined and evaluated.
- Detection of or safeguards against hazards arising from substance reactions caused by an accidental backflow of individual reactants through wrong pipe connections were not carried out to a sufficient degree.
- The storage of substitute fuels which are classified in the terms of waste legislation raised problems because chemical legislation and waste legislation are not congruent.
- Requirements relating to fire prevention (building laws and regulations etc.) were not sufficiently considered.

during working at disposals”

- Operators had difficulties with the implementation of the technical regulations in particular with those relating to fire and explosion prevention (in this context protection against dust explosion poses a special problem).
- Explosion prevention concepts have to take regard of organisational measures of safe inerting in cleaning and emptying processes and a documentation thereof.
- Escape and rescue routes were inadequate illuminated, labelled and only limited usable.
- Safety management system or the way it was presented did not correspond to the Hazardous Incident Ordinance.
- Safety organisation showed deficiencies.
- Process and operational manuals were incomplete, missing or were not communicated.
- Instruction of the operational staff and briefing of staff from other companies was incomplete.
- Contingency plans / alarm and hazard prevention plans did not correspond to the Hazardous Incident Ordinance or were not updated.
- Labeling of important safety related equipments were missing.
- Documentation of a plant was not suitable for a safety-related evaluation.
- Documentation of maintenance and alterations was missing or inadequate.

By way of summary it can be noted that the bulk of shortcomings often occur in the same areas they did for the 1999 to 2002 period, displaying marked deficiencies in the following areas: (constructional) fire prevention, explosion prevention, process control engineering, process related design and organisation. Inadequate execution of safety-checks and deficiencies of systematic examinations are also bulks of shortcomings in 2003 (see graph below).

Failure Codes – Frequency of Occurrence 1999 - 2003



Code	Topic
1.	design of plants and plant parts taking into account potential strain during a disruption of normal operation
1.1	design and dimensioning of construction components (earthquake resistant construction, wind loads, other loads)
1.2	process related design (process management, plant protection concepts)
1.3	design of components (design and dimensioning, materials, strain imposed by pressure, temperature, media)
2.	quality assurance and servicing of plants, checks
2.1	maintenance and repair works
2.2	periodic inspections (start-up check and regular checks), conformity
3.	supply with energy and operating resources (electricity, fuel, vapour, water, control air, others)
4.	process control equipment, electrical engineering
4.1	classification according to DIN V 19 250 or VDI/VDE 2180
4.2	Operation of Process Control Equipment construction/make of the safety instrumented systems
5.	considerations concerning systems analysis (hazard analysis, safety analysis)
6.	chemical, physical, human-eco toxicological properties of substances and preparations (determination and/or assessment of toxicological, chemical, physical and reaction engineering properties of substances and preparations)
7.	impact of operation failures and incidents, identification (calculation) and assessment (hazard scenarios)
8.	fire protection, retention of fire-fighting water (constructional fire protection, early detection of fire, fire-fighting measures, fire loads, retention of fire-fighting water)
9.	in-plant explosion protection and protection against impacts from outside explosions
9.1	gases/vapours
9.1.1	preventive explosion protection
9.1.2	constructional explosion protection
9.2	dusts
9.2.1	preventive explosion protection
9.2.2	constructional explosion protection
10.	organisation
10.1	alarm and hazard prevention plans
10.2	escape and rescue routes
10.3	measures relating to the set-up of the plant
10.4	safety management