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Reasonable tightness checks

Existing regulations for the construction of facilities for slurry storage and demanuring primarily aim to mark the latest status of knowledge in the avoidance of environmental damage and to apply it in new facilities.

However, what about containers and storage facilities which were more or less built “in the distant past” and whose design does not conform with currently applicable standards?



Fig. 1: Leakage in a newly built slurry channel

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Constructional facilities for the storage of water-endangering or water-polluting substances which require a permit today must conform with such a large number of legal requirements, construction standards, and regulations that even experts who are concerned with the relevant topics have difficulties keeping up with current developments. Particular static requirements for crack limitation according to new DIN standards (DIN 11622 Silage Silos and Slurry Containers from 2005, DIN 1045 Steel Concrete Construction from 2005) as well as different environmental laws, decrees and state-specific directives (Water Management Resources Act, Directive Relating to Facilities for the Storage of Water-Endangering Substances) can be used as examples here.

Current construction permit requirements for slurry containers include the following standard formulation:

“Facilities for the storage and dispensing of liquid manure, slurry, and silage effluents (LSS facilities) must be designed, installed, put up, maintained, and operated such that water pollution or any other deterioration of the water condition is excluded as required by § 19g, paragraph 2 of the Water Management Resources Act”.

Farm management systems and cross compliance put growing demands on farms with regard to adherence to legal requirements. This not only applies to proper arable farming and animal husbandry, but also to areas beyond typically agricultural production. Liability regulations, for example, also comprise constructional facilities which belong to the farm, in particular if they can cause damage to the environment. In principle, the owner and operator is always liable. Therefore, it is all the more important to be able to prove that one has fulfilled one’s duty as an operator.

Since LSS facilities for which a construction permit is applied for today may only be built by specialized construction companies, the owner has the possibility of passing on liability claims in the case of damage, at least as far as the above-mentioned points are concerned. However, a clear work contract with the construction company and a clearly defined exclusion of liability, which may result

from cooperation in construction or work done by the owner, are important in such cases.

Old facilities as a source of problems

How can constructional facilities which farmers often considered replacements exempt from permit requirements after changeover from solid to liquid manure systems be legalized later?

The permit procedure initiated later pursues the following objectives:

- examine, detect, and, if necessary, minimize potential danger for people, animals, and the environment
- provide legal security for the operators
- update the construction documentation of the licensing authorities.

Legal regulations are generally worded such that the consideration of individual cases and exceptional provisions provide the possibility of using margins of discretion in a very different manner. Therefore, the approach of the licensing authorities varies greatly in legalization procedures for facilities built without permit. Shutdown and demolition are the last solution of choice for the establishment of order under construction law. In jurisdiction, the principle of proportionality and adequacy counts. This also applies to retroactive decisions.

Since existing facilities have already created facts, the possibilities of realizing currently applicable regulations retroactively and checking them are limited. In addition, work done by the owner has always been a significant element of farm construction. Virtually no planning documentation is available, and it is even more unlikely that static calculations or proof of inspection for the materials used exist. Decisions about design were made and construction was realized based on old customs, the experience of previous generations, and at best the consultation of a bricklayer or rural architect living in town.

So far, the construction of facilities without a permit has become apparent only in rare cases, such as

- alterations which require the assessment of the entire farm

- cases of damage which become publicly relevant (accidents, epizootic diseases, fish mortality in the vicinity of facilities...)
- complaints of neighbours for various reasons

In such cases, the submission of construction drawings, a description of construction and operation, proof of stability, and a tightness check by an approved planner were required. In addition, it had to be proven that the realization of the construction project conformed to the plans. These demands are often difficult to fulfill because tracing back was not always possible and planners can be held liable for the content of their plans and the approval of construction. Only few architects agreed to such investigations especially since their extent often cannot exactly be considered financially lucrative.

Do not go overboard

With regard to proportionality, the potential danger caused by facilities which have not been legalized should be the primary aspect, which does not mean that construction law should be neglected. Or in the words of Paracelsus, a physician from the 16th century, who was already able to differentiate: "Only the dose causes something not to become a poison."

In individual cases, however, the requirements to be fulfilled for retroactive permits had to be strongly called into question with regard to economic viability and practicability. Sometimes the opinion prevailed that "ultimately those who are responsible for construction without permit should not be better off than owners who adhere to the law".

This led to requirements which come close to new construction. Because no concrete delivery notes with the relevant proof of concrete quality were submitted or because channels were built, plastered, and treated with grouting compounds for which no proof of quality was available, the additional construction of channels in the existing channels according to the current state of the art was required. In other cases, the coating of the entire channel area with double-layered film and an integrated lacquer identification system between the film layers was demanded.

With a few exceptions, most licensing authorities applied objective, practice-oriented

criteria. A lack of stability of channels and containers for slurry storage, which is generally clearly noticeable, is the primary cause of immediate danger for the life and health of people and animals. Therefore, inspection by an expert is the basic requirement for a retroactive permit.

At least theoretically, the danger for soil and water due to potential leaks is more difficult to assess. In contrast to liquids whose consistency is homogeneous, slurry consists of a mixed liquid and solid phase. As a result, liquids seep away first in the case of leaks. In some cases, however, capillary cracks are permanently sealed by thickened liquids, such as liquid manure. If, however, liquid losses occur, the remaining solid substances condense to such an extent that time-consuming mechanical removal is necessary in order to empty the channel. Therefore, appropriate countermeasures must be taken in the user's own interest when this first happens.

Tightness checks – what measures are appropriate?

The proof of tightness for such old facilities based on current inspection procedures and the regular checks required in some cases remain a problem.

Filling with water

In new facilities, the containers are filled with water up to a height of 50 cm and checked for tightness by means of inspection of the endangered points in particular. In the case of so-called typical containers, i.e. containers above the ground, whose base points can be inspected at any time, checks are relatively easy. Containers or channels which are buried only superficially can be evaluated in the same manner by exposing them down to the bottom plate level. This also allows the design and construction of pipes, slides, and other technical equipment which are possibly part of the facility to be examined.

Existing channels and containers at greater depths as well as containers whose walls and bottom plate connections cannot be exposed from outside (within buildings), would require more complicated procedures. So far, generally applicable, appropriate, and safe procedures cannot be recommended. All control procedures focus on random checks. Location-related differences alone

do not allow general conclusions to be drawn. The properties and the permeability of the soil, the location of water-bearing layers, and previous damage to the subsoil are specific influencing factors.

In the majority of cases, it is probably inappropriate and also disproportionate to demand that existing facilities be generally emptied and exposed for checking, that their walls and floors be cleaned with high-pressure cleaners and that they subsequently be filled with water. Depending on the housing technique, processes on the farm would be considerably disrupted (disassembly of stall equipment, interruption of production...). In addition, cleaning could even cause leaks which have not existed up to this point.

Analyses of drilling- and soil samples

For this purpose, soil samples are taken at defined distances around the container or the channel and under the bottom of the container. Inside buildings, this requires that floors be drilled open and closed afterwards.

The following questions, however, remain unsolved: How likely is it that the weak point has been detected? Which values for which substances indicate the existence of leaks? Is detected pollution caused by old facilities on top of which new ones have been built or by the fertilizing of areas in the environment?

Conclusions for permit procedures in practice

During permit procedures, which also include tightness checks, the majority of the licensing authorities in Lower Saxony limit intensive tightness checks to cases of well-founded suspicion and obvious weaknesses.

Generally, the usual documents for construction permit applications, i.e.

- site plan, ground plan, sectional drawings
- operational and functional description
- description of the construction materials used

and an assessment by construction experts who are experienced in farm construction with random checks of sensitive points and photographic documentation are considered sufficient.

Container checks also include checks of pipes and slides. Especially older containers, for which filling and tapping in the bottom plate area was still permitted, are a great risk unless both slides function.