Episode 01 Nov. 2021

Rat Control in Drainage Systems

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- Monthly a new topic for discussion
- Exchange of knowledge in wastewater
- Passion sharing
- Get to know you!

Abwassertalk:
https://www.podcast.de/podcast/795779/abwassertalk

Episode	Webinar Topic	Content	Time
01	**Rat Control in Drainage Systems**	Environmental risks & application of waterproof baiting station in drainage systems	05 Nov. 21 10:00
02	**Drainage System Inspection (Drone & Boat)**	Innovative inspection of drainage systems using drone and camera-equipped boat	02 Dec. 21 10:00
03	**Extraneous Water Entrance Prevention**	Impacts of extraneous water & countermeasures?	13 Jan. 22 10:00
04	**Indirect Discharger Cadaster Investigation**	How to easily obtain full supervision over indirect discharger in your region?	03 Feb. 22 10:00
05	**Live Flow Monitoring in Drainage Systems**	Why is it so important to know the live-flow in our drainage system?	03 Mar. 22 10:00
06	**Exhaust Air Treatment in Wastewater Sector**	Odour treatment through external equipments	07 Apr. 22 10:00
07	**Sulfide Balance in Drainage Systems**	Automatic calculation of sulfide balance & introduction to SULFIDUS	05 May 22 10:00
08	**Special Episode: IFAT Munich 2022**	What is new at the IFAT this year?	02 Jun. 22 10:00

since 1990

UNI TECHNICS ENGINEERING

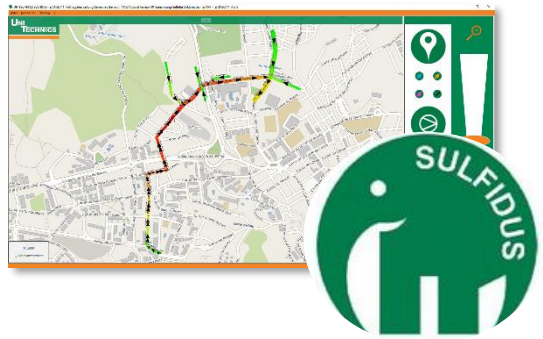
since 2000

UNI TECHNICS PRODUCTS

Engineering Consulting

Indirect Discharger Investigation

Sewage System Inspection



Sulfide Balance SULFIDUS

Odour & Corrosion

Extraneous Water Seal

Dosing & Exhaust Air Treatment

Rat Control


The war is on!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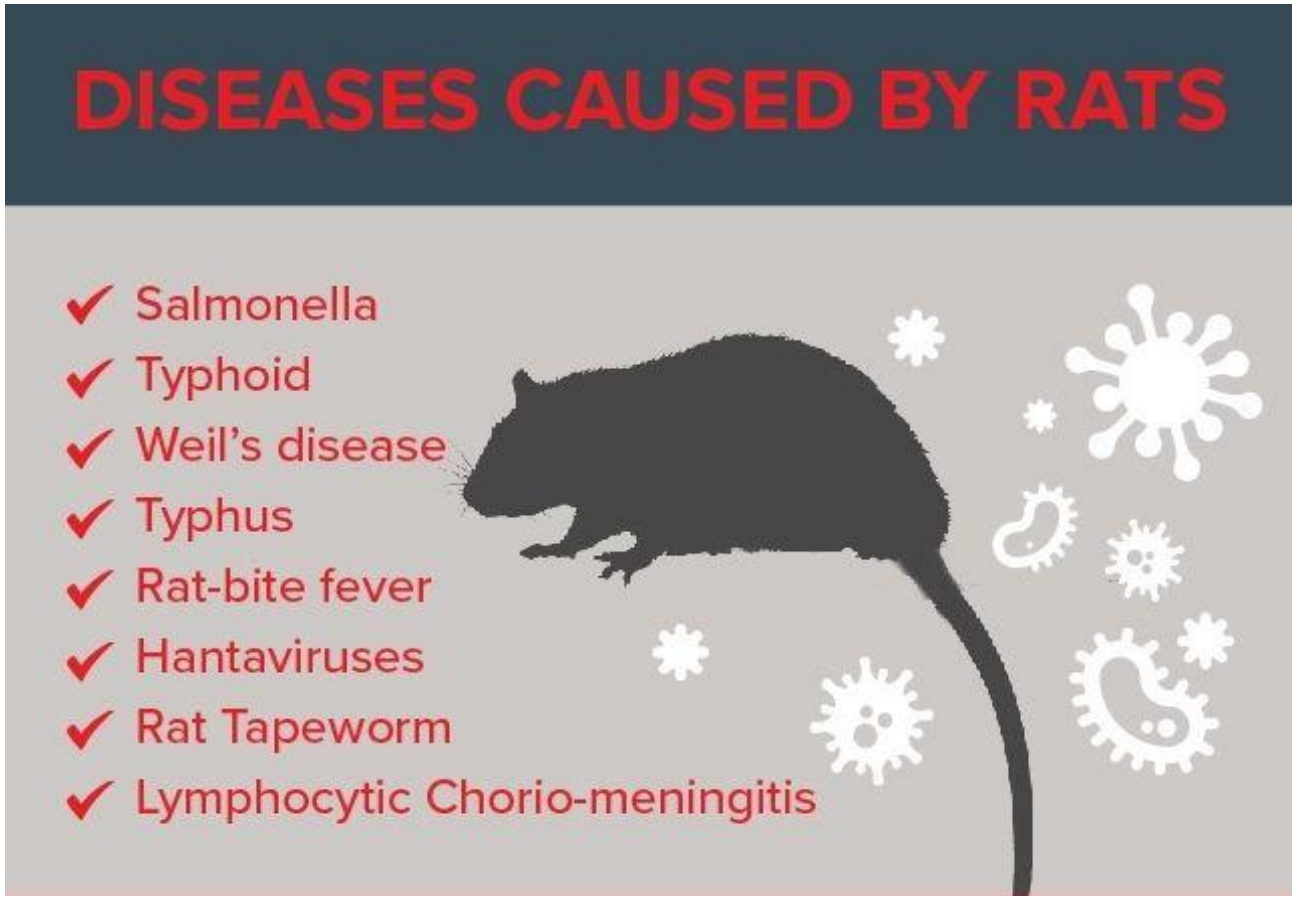


- Pathogen carrier
- Spreading diseases
- Source of allergens
- Weaken building structures

Which rodent species are allowed to be controlled in Germany?

- all mammals are fundamentally granted special protection status
- some rodent species are exempt from this protection:
  - House mouse (*Mus musculus*)
  - Brown rat (*Rattus norvegicus*)
  - Black rat (*Rattus rattus*)
  - Water vole (*Arvicola terrestris*)
  - Bank vole (*Myodes glareolus*)
  - Field vole (*Microtus agrestis*)
  - Field mouse (*Microtus arvalis*)


Brown rat


House mouse


Black rat

Anticoagulant Rodenticides

- Poisonous baits
- Mostly used in EU market
- Authroisation acc. Biocidal Products Regulation (BPR) No. 528/2012
- Use under strict risk mitigation measures (RMM)

First-generation anticoagulant rodenticides (FGAR)
Chlorophacinone
Coumatetralyl
Warfarin
Second-generation anticoagulant rodenticides (SGAR)
Brodifacoum
Bromadiolone
Difenacoum
Difethialone
Flocoumafen

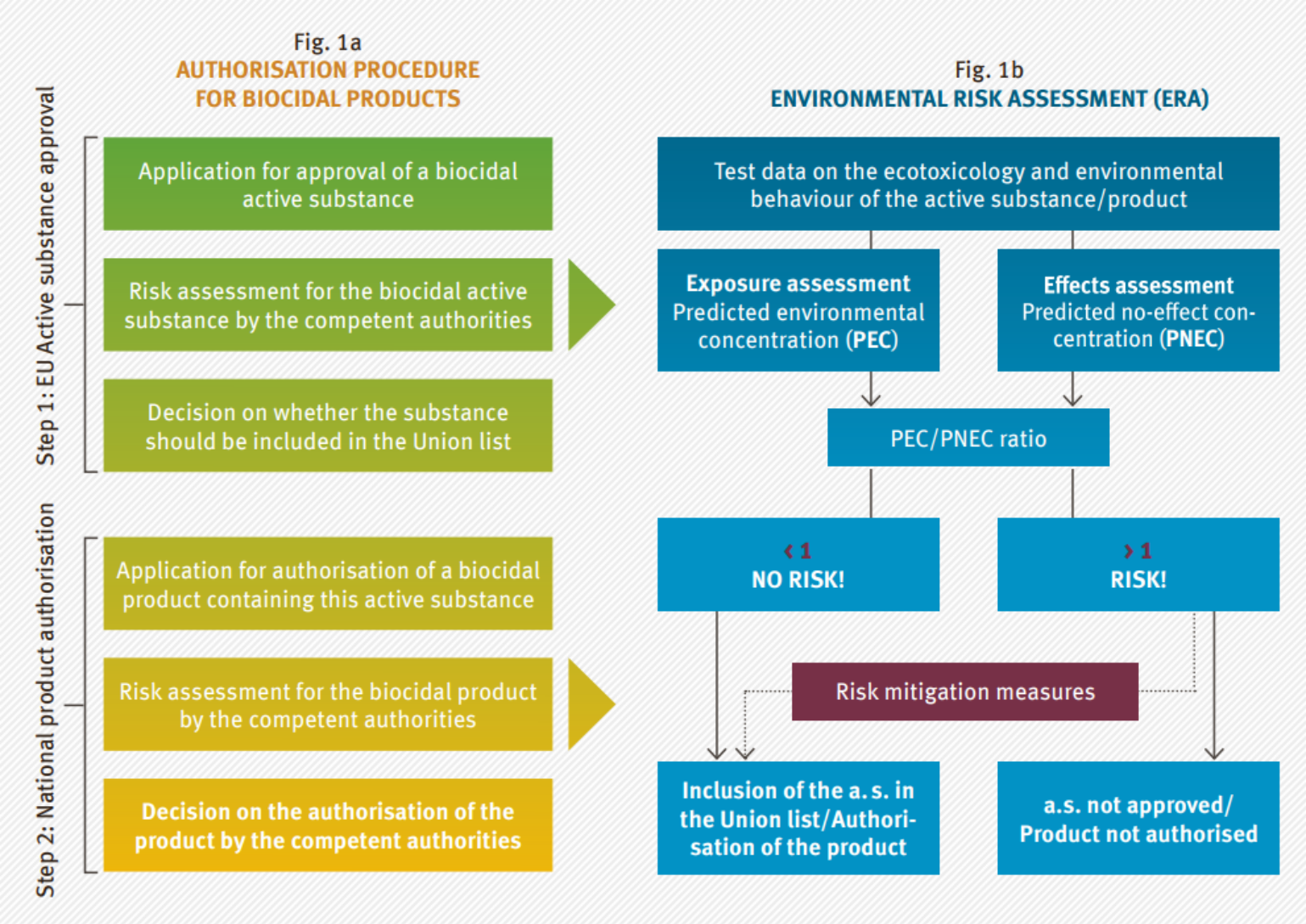
- Containing blood-clotting inhibitors

  --> anticoagulants
- A loss of the blood-clotting ability

  --> death from internal bleeding
- Effects start 3-7 days after ingestion

  --> no bait shyness

- FGAR: multiple dose required
- SGAR: single intake sufficient



Step 1: avtive substance approval at EU level

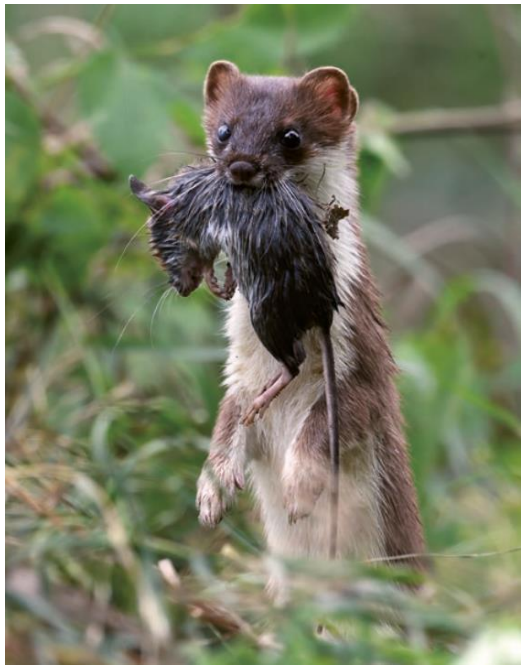
Step 2: biocidal poducts approval at national level

- **P**ersistent **B**ioaccumulative **T**oxic --> release into environment forbidden!
- Unacceptable effects on the environment --> conditions for authorisation not met!
- Equally effective and less harmful alternatives to anticoagulants are lacking

- ➢ Anticoagulants eventually get first approved from 2010-2012
- ➢ Shorter approval period for 5 years --> re-authorisation required
- ➢ Risk mitigation measures must be applied

- Blood-clotting mechanism similar in mammals and birds
- Very high risks to wildlife
- Accidental poisoning of non-target animals
  - Primary poisoning: non-target animals feeding on the baits
  - Secondary poisoning: animals feeding on poisoned rodents

    --> can only be minimised but not avoided



- systematic analysis of **residues of anticoagulants in wild animals** in Germany
- residues of anticoagulants detected in several small mammalian species (wood mice, shrews…) as well as in owls and birds of prey (common buzzards)
- residues of anticoagulants found in 61 % of liver samples collected from 265 foxes

➢ Long-term effects on behavior and reproduction

➢ Cause death

Residues of anticoagulant rodenticides in freshwater fish from various large watercourses in Germany

Sampling area

Saarländischer Verdichtungsraum	Important, old-industrialised conurbation in Germany. Search data
Bornhöveder Seengebiet	Main water divide between the North- and Baltic Sea Search data
Rhein	Longest river in Germany Search data
Elbe	Fourth largest river basin in Central Europe Search data
Verdichtungsraum Halle-Leipzig	Region in the chemical triangle of Central Germany Search data
Donau	Second largest river in Europe Search data

Biocides and plant protection products	Chemical agents against harmful organisms and for plant protection Search data
Rodenticides	Control agents against mice, rats and other rodents

Substances

Wafarin	1st generation anticoagulant Search data
Chlorphacinone	1 st generation anticoagulant Search data
Coumatetralyl	1 st generation anticoagulant Search data
Flocoumafen	2nd generation anticoagulant Search data
Bromadiolone	2nd generation anticoagulant Search data
Brodifacoum	2nd generation anticoagulant Search data
Difenacoum	2nd generation anticoagulant Search data
Difethialone	2nd generation anticoagulant Search data

--> https://www.umweltprobenbank.de/en/documents/profiles/specimen_types/10031

- Widespread occurrence of SGAR in fish from large watercourses
- At least one SGAR was detected in every fish sample from the 16 river sampling sites across Germany
- Brodifacoum was detected in almost 90 % of the 18 examined fish liver samples

…

➢ Acute effects are not to be expected

➢ Threat to higher aquatic organisms & top predators via aquatic food chain

Sewer baiting contributes to the release of anticoagulant rodenticides into the aquatic environment (Regnery et al. 2019b)

- Active ingredients leach into wastewater when baits are scoured by wastewater/stormwater runoff
- Incomplete removal of anticoagulant rodenticides during conventional wastewater treatment
- Anticoagulants discharged into surface water and pollute aquatic environment

➢ Baits must not come into contact with water and not be washed away!

How many bait material containing anticoagulant rodenticides are used annualy in Germany for rat control in sewers?

Over 600 tons!

- Rodenticide baits often applied extensively, permanently and in large quantities
- Bait points in every other manhole in a sewer network
- False assumption that rats are ubiquitously present throughout the sewer system

➢ Mandatory **PRE-BAITING SURVEY** before rodenticides can be used in sewers

- Install & check non-toxic baits at selected manholes in sewers
- If uptake, replace by anticoagulant rodenticides
- If infestation eliminated / no further uptake, remove anticoagulant rodenticides and replace it by non-toxic bait

Pre-baiting Survey

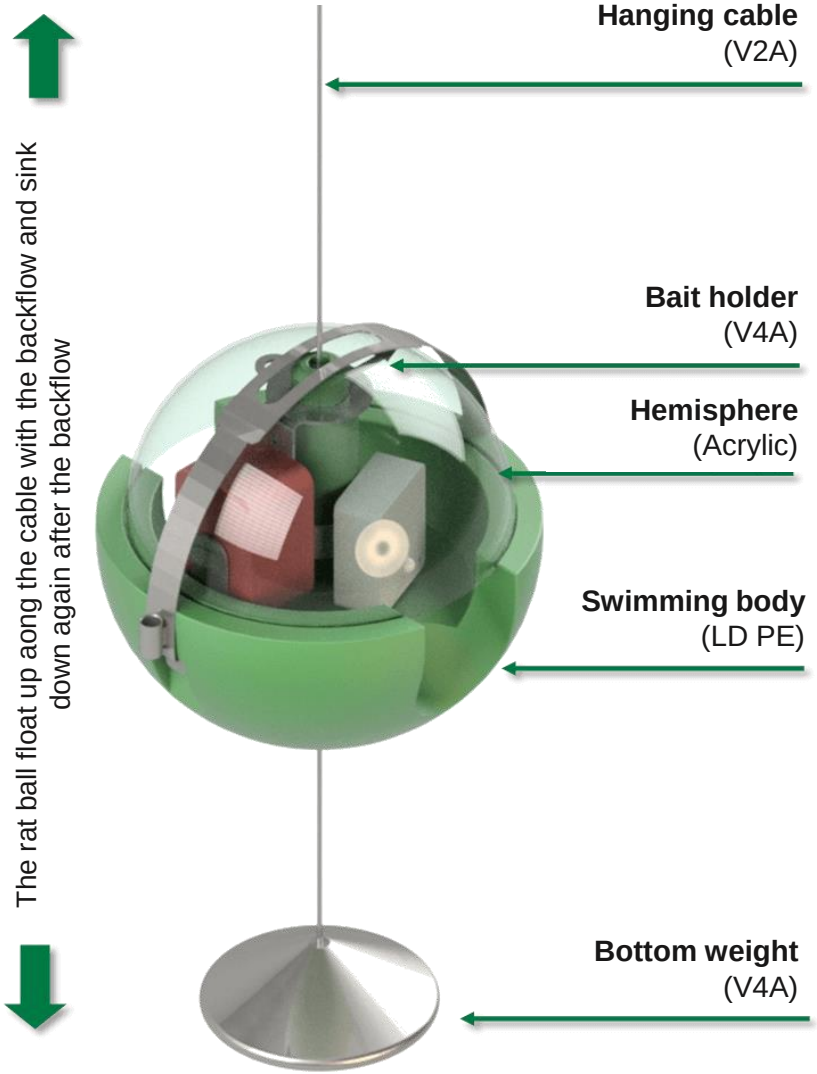
Deploy baits in the sewers
on a wire in a manhole / in a waterproof bait station

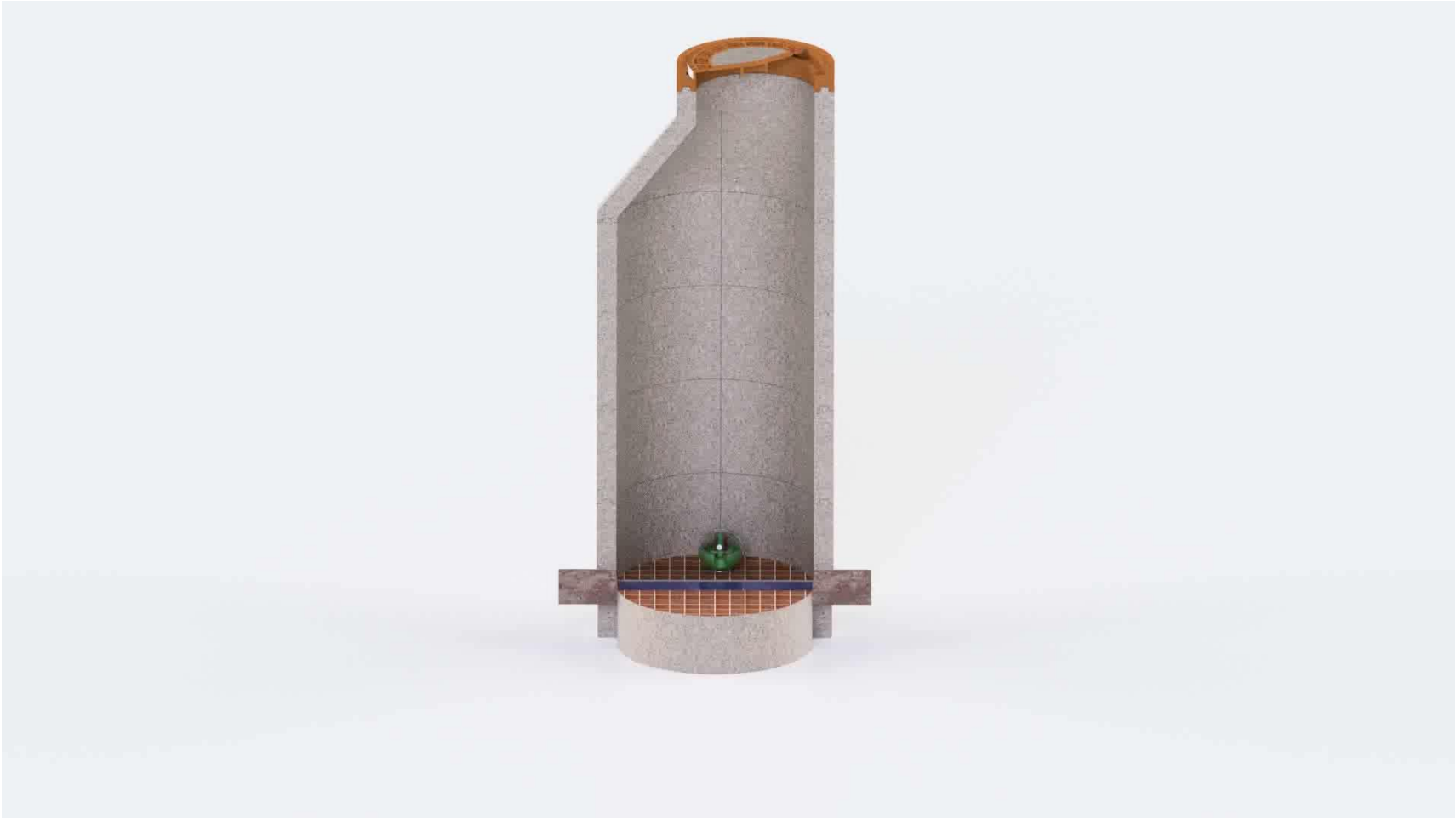
Inspection of bait points & documentation
initially after 14 days
subsequently every 2-3 weeks

remove remaining baits and dispose as hazardous waste
permanent baiting is not permitted

Our solution: Rat Ball® by UNITECHNICS

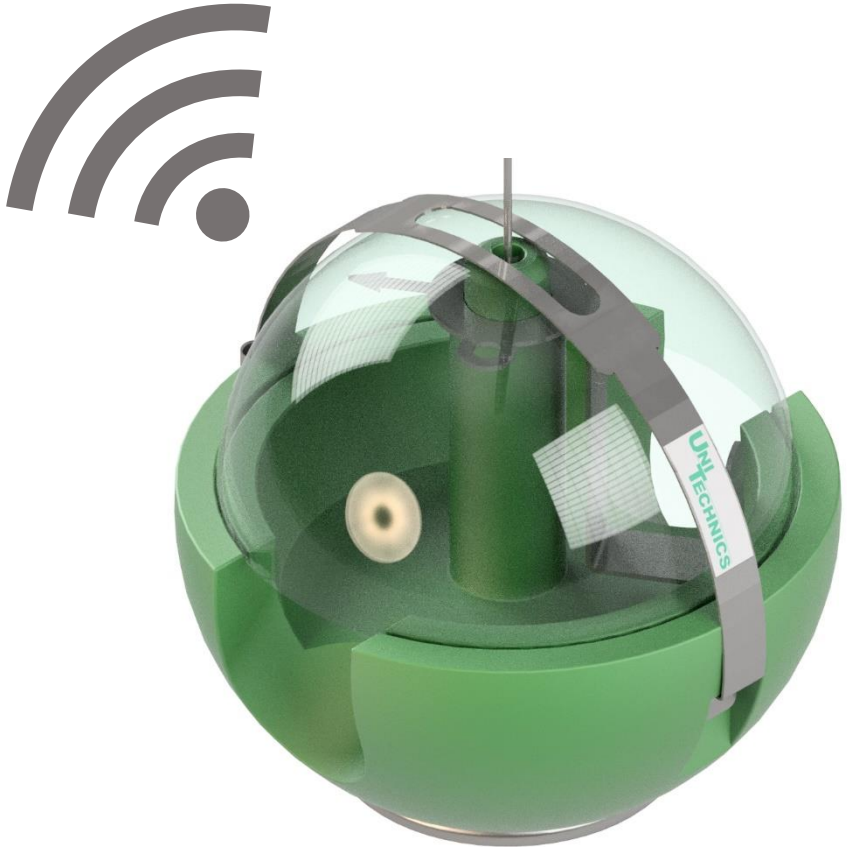
- Water-proof baiting station
- Small and handy (size like a football)
- Installation without entering shafts
- Against backflow and water from above
- Quick change of baits
- Easy transfer to other Shafts





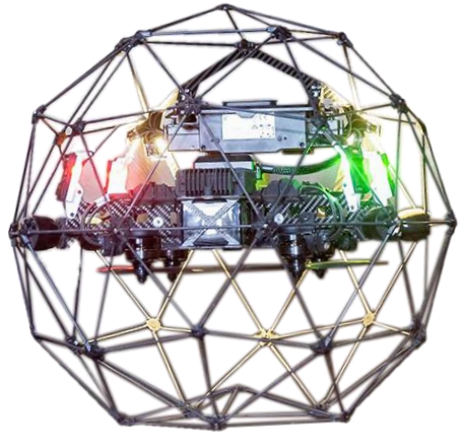
Rat Ball® with sensor by UNITECHNICS

- Localization of the rat balls
- No manual inspection required on site
- Logging of rat visits, bait changes and notes
- Email alerting of rat visits and battery condition
- No additional signal amplifiers or readout devices required
- Worldwide reception and data transmission



What kind of rat control methods are being used in the sewers in your region?

- Why rats need to be controlled? What kind of rats?
- Countermeasures against rats
- Anticoagulant rodenticides (type, effect, authorization)
- Environmental risks of using anticoagulant rodenticides (wildlife, aquatic life)
- Rat control in sewers (pre-baiting, normal procedure)
- Application of Rat Ball® in sewers



Thank you!

See you next month on 2nd December!

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