IAEA Workshop
Decontamination Technologies – Mechanical Methods

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Decontamination techniques

1. Chemical and electrochemical methods

2. Thermal methods

3. Mechanical methods
   - Basic techniques
     - Brushing, washing, scrubbing, vacuum cleaning
   - More aggressive techniques
     - Grinding, needle scaling, scabbling, concrete shaving, hydraulic or pneumatic hammering, high-pressure water jetting, abrasive blasting (steel grit blasting)
Mechanical methods

Shaving mills

Classification / division

1. Transverse or longitudinal drum cutters for excavators

2. Mills for the removal of thin wall layers and cover layers
Mechanical methods

- Shaving mills
  - transverse or longitudinal drum cutters for excavators
    - There are mills to adapt near carrier devices in different scales and implementation kinds
    - Basically it can be distinguished in:
      - Longitudinal drum cutters
      - Transverse cutter heads

Source: http://www.erkat.de/en/
Mechanical methods

- Concrete shaving

- Transverse or longitudinal drum cutters for excavators
Mechanical methods

Concrete shaving

- Mills for the removal of thin wall layers and cover layers

- Operational areas:
  - Removal of coatings, layers, dirt, colour and plaster
  - Milling of mineral surfaces like screed or concrete
  - Removal of surfaces with bonded or penetrated contamination of concrete, stone or synthetic resin coating
Mechanical methods

- Concrete shaving
  - Mills for the removal of thin wall layers and cover layers

- rotary milling drum
- metal-clad
- freely swivelling
- extraction
- milling drum
- several axes
Mechanical methods

- Concrete shaving

  - Mills for the removal of thin wall layers and cover layers

    a) Pentagonal cutters with tungsten carbide inserts, for roughening concrete, for removing old coatings
    b) Beam cutters for removing paint from concrete
    c) Milling cutters for removing and stripping thermoplastic and cold plastic coatings and concrete

Source: http://www.vonarx.com
Mechanical methods

Concrete shaving

- Mills for the removal of thin wall layers and cover layers
  - Wall layer and cover layer machines

Source: Studsvik®SINA; documents of information
Mechanical methods

- Concrete shaving
  - Mills for the removal of thin wall layers and cover layers
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Source: Studsvik®SINA; documents of information

„shaver-stacker-system“  „shaver- scaffolding-system“
Mechanical methods

Grinding

Diamond disc for polishing of tiles and concrete (Star arrangement)

Source: http://www.roll-gmbh.de/25.0.html
Mechanical methods

Grinding

Wall layer machine

- Working head with feather package and diamond grinding disc

Source: Winkler, S.; Analyse des Forschungsstandes „dünnflächiger Oberflächenabtrag“ von Beton und Mauerwerk
Mechanical methods

- Needle scaling

- Steel needles for pocketing
- Steel needles are highly wear-resistant
- Needle gun is pursued with air pressure → steel needles move to and fro; hammer at their free end at right angles at the concrete surface
- Needles move freely and adapt themselves to every surface
- Number of the steel needles according to intended purpose

Source: http://www.vonarx.com
Mechanical methods

- Scabbling
  - Steel ruffian with hard metal points with different number in teeth
  - Work surface amounts up to 40 x 40 mm²
    - steel ruffians only suitable for the treatment of small surfaces

Floor heads with 16 teeth (on top) and 36 teeth (below)

Source: http://www.gemba.at
Mechanical methods

- Scabbling

Hand-controlled devices

Source: http://www.vonarx.com
High-pressure water jetting

Merely the pure high-pressure water jetting is suited for the decontamination of surfaces
Mechanical methods

- High-pressure water jetting
Mechanical methods

High-pressure water jetting

Problem

- Large amount in secondary rubbish in the form of water and outworn material

additional disposal of the used, radioactively contaminated process media
Mechanical methods

Steel grit blasting cabin

Source: E.ON-Kernkraft GmbH; Vom Kernkraftwerk zur „grünen Wiese“ - Stilllegung und Rückbau des Kernkraftwerks Würgassen; 3. Auflage 08/2008
Mechanical methods

Steel grit blasting cabin

Source: http://www.wak-gmbh.de
Thank you for your attention!