

IAEA Workshop Decontamination Technologies – Mechanical Methods

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Source: <http://www.pbase.com/camboy/image/48351518>

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



Longitudinal drum cutters



transverse cutter heads

Source: <http://www.erkat.de/en/>

Mechanical methods

■ Concrete shaving



Mechanical methods

■ Concrete shaving

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

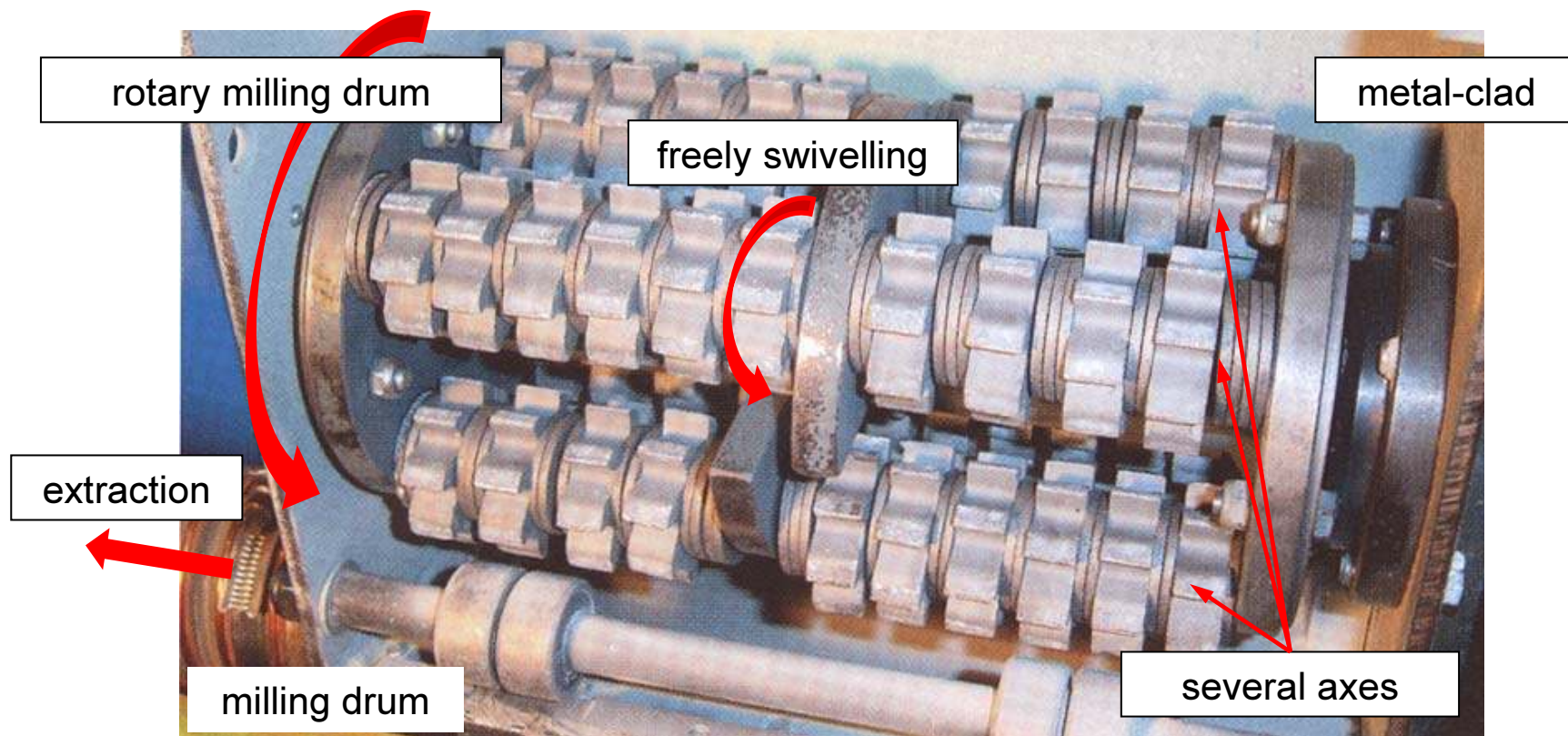
■ Operational areas:

- 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

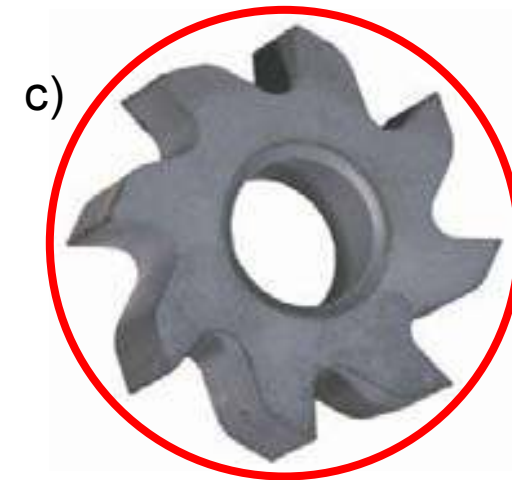
- Mills for the removal of thin wall layers and cover layers



Mechanical methods

■ Concrete shaving

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



Different milling tools:

- 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

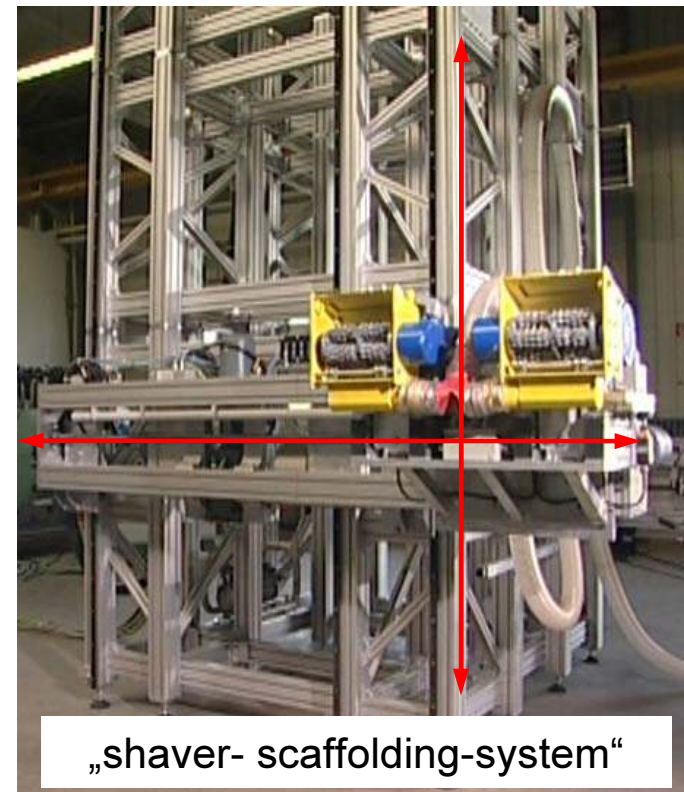
Mechanical methods

■ Concrete shaving

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



„shaver-stacker-system“



„shaver- scaffolding-system“

Source: Studsvik®SINA; documents of information

Mechanical methods

■ Grinding



Diamond disc for polishing of tiles and c
(Stagger arrangement)

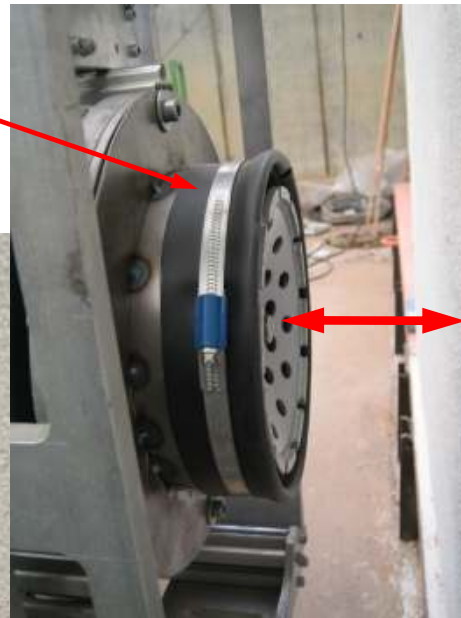
Source: <http://www.roll-gmbh.de/25.0.html>

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 $40 \times 40 \text{ mm}^2$
 - 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



Floor-Scabbler

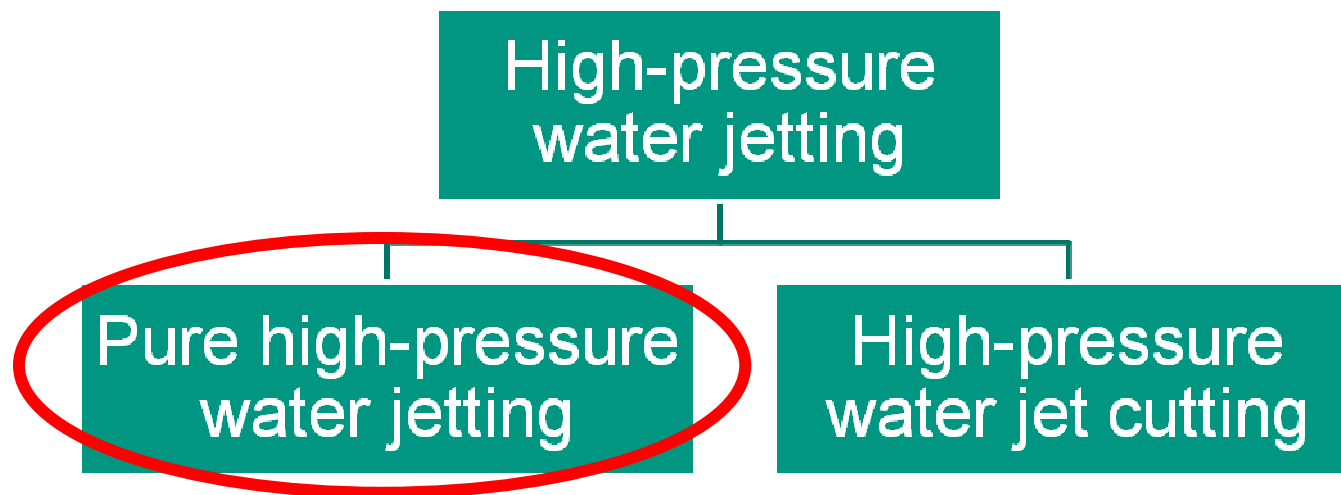
Hand-controlled devices



Source: <http://www.vonarx.com>

Mechanical methods

■ 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 Würiggassen; 3. Auflage 08/2008

Mechanical methods

■ Steel grit blasting cabin



Source: <http://www.wak-gmbh.de>

Thank you for your attention!