

Report

Construction Engineering



Water as a tool
for a clean environment

High-pressure water jetting has progressed from an alternative for a limited range of applications to a versatile technique which is recognized as state-of-the-art in construction engineering. This development was particularly promoted by the implementation of new regulations concerning remedial work on buildings and other structures, as well as by requirements in the field of environmental engineering. High-pressure water jet units and tools are today employed successfully in all areas of construction engineering: soil and foundation

engineering, civil engineering projects, remedial work, building materials engineering, demolition, and recycling. The WOMA high-pressure water jet technique is suitable for:

- ▶ Cleaning of concrete, stone, brick and metal surfaces.
- ▶ Raking out of joints.
- ▶ Removal of coatings and paint from surfaces, technical equipment, and construction elements.
- ▶ Derusting of steel surfaces and reinforcement bars.
- ▶ Partial removal of deteriorated concrete and exposing of corroded

reinforcement bars.

- ▶ Roughening of concrete surfaces.
- ▶ Heavy hydrodemolition of concrete.
- ▶ Cutting and separating of steel, reinforced concrete, etc.
- ▶ Widening of cracks in reinforced concrete prior to filling.
- ▶ Removal of residues and incrustations from autoclaves, vessels, heat exchangers, ducts, and pipelines.
- ▶ High-pressure water jet support for sheet-pile driving and various clearing operations.
- ▶ Jet cutting of building materials (insulating material, rubber, glass, natural stone, etc.)



Decoating of reinforced concrete with hand-held high-pressure water jet guns



Heavy concrete hydrodemolition



Vibration-free cutting of reinforced concrete floors by abrasive high-pressure water jets



Concrete hydrodemolition in drydocks

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Why High-Pressure Water Jets?

- ▶ There is a wide range of tools available.
- ▶ Small reaction forces; therefore, the technique can easily be mechanized and automatized.
- ▶ No gas, vapour or slag formation.
- ▶ Minimum vibrations.
- ▶ Negligible structure-borne sound.
- ▶ Selective material removal behaviour (distinction between different concrete strength and between coating and base material).
- ▶ High pull-off strength. The required value (1.5 MPa) can be realized with a 95 % reliability.
- ▶ No damage or loosening of internal parts (reinforcement bars, prestressing elements) or transition zones.
- ▶ No influencing of the surface structure or mechanical properties of the parts and materials treated.
- ▶ The high-pressure waterjet technique is recommended, or even prescribed, in nearly all relevant technical guidelines and regulations in construction engineering.

Range of Materials

Using high-pressure water jetting, the following materials can reliably and efficiently be removed:

adhering multi-layered coatings, worn protective coatings, chemical contaminations, joint mortar, parting agents, oil, dirt, damaged and lowstrength concrete layers, rust, anticorrosive paint, cakes and incrustations, earth and contaminated soil.

Using abrasive ultra-high pressure water jet units, the following materials can reliably and efficiently be cut or separated:

Construction steels, coated metal structures, pipeline elements, heavily

reinforced concrete members, fibre-reinforced materials, multi-layered construction elements, glass, ceramics, insulating material.

The Technique

WOMA offers the complete range of the high-pressure water jet technique. WOMA's plunger pumps, equipped with central valve heads, generate operating pressures up to 3,000 bar and deliver water flow rates up to 1,679 l/min.

For maintenance work and heavy hydro-demolition, WOMA has developed complete systems including innovative units for connecting several tools in the ultra-high pressure range.

The WOMA-program for construction engineering also includes the following components:

- ▶ Hand-held lances for cleaning and stripping.
- ▶ Hand-held guns in modular design for the treatment of sensitive surfaces and selective removal.
- ▶ Emission-free performing tools for horizontal and vertical cleaning and stripping tasks with simultaneous suction of water and waste material.
- ▶ Self-driving and externally driven rotating nozzle heads for careful surface preparation.
- ▶ Hydraulically driven nozzle heads and traversing units for heavy hydrodemolition of concrete.
- ▶ Mobile abrasive ultra-high pressure water jet cutting systems.
- ▶ Sewer cleaning nozzles and pipe cleaning systems.
- ▶ Positioning devices and vessel cleaning heads for internal container cleaning.
- ▶ Special tools.



Partial concrete removal and exposing of reinforcements with hand-held water jet tools



Heavy hydrodemolition of concrete with specially developed high-pressure robots

High-pressure water jet supported sheet pile driving



Bitumen removal from a profiled steel base with rotating nozzle head without damaging the steel

