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EKONT-2: advancement of a demonstrator for dry–mechanical decontamination of corners and inner edges in nuclear facilities

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Abstract. In order to be able to dismantle nuclear power plants after decommissioning, all surfaces must be decontaminated before conventional demolition. Difficulties in decontamination are not caused by large and easily accessible areas but rather by the corners and inner edges that are difficult to access and cannot be reached with existing machines. In order to be able to decontaminate these areas, however, hand-held tools are currently being used that were developed for conventional dismantling and building renovation. In order to ensure occupational safety and to prevent the spread of contamination, these devices must be used with an external suction system. The area coverage that is already low is thus further reduced, and hard-to-reach areas are even more difficult to reach. These factors and working in protective suits make these decontamination tasks a great challenge for the workers carrying out the work.

The EKONT-2 research project was launched to make this work easier and more efficient. This project, which is funded by the Federal Ministry of Education and Research (BMBF), has set itself the goal of developing an innovative, partially automated demonstrator for dry-mechanical decontamination of corners, edges and imperfections in nuclear facilities. For this purpose, different active principles have already been examined, evaluated according to scientific methods and implemented in the form of four test models.

One of the test models enables material removal with high-frequency vibrations and a diamond-coated tool. The other three demonstrators remove the material with rotating diamond discs and rotate in different directions depending on the design. To realise the different directions of rotation, one of the demonstrators is equipped with a newly developed gear, for which a patent application has already been submitted.

Before the devices could go into practical testing, various performance parameters were recorded and evaluated in a test stand specially developed for this purpose. In addition, the reliability of the devices could already be tested, and any problems that arose could be rectified.

After this detailed test of the devices in the test stand, the test samples could be checked for their practical suitability in the Obrigheim nuclear power plant. Here, workers at SAT Kerntechnik GmbH tested the devices in a real environment and were able to give mostly positive feedback on the developed demonstrators. In addition, the feedback has revealed potential for improvement that is to be pursued and implemented in a subsequent project.

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