N181. A Brief History Of Robots In The United States

Robots of all kinds are on offer to the nuclear industry. A new survey reveals which applications are most popular. Robot use in the nuclear industry has increased considerably in the last ten years, and robotic devices are now routinely considered as an option in planning maintenance programs. Although development on a wide range of devices is underway, apart from those areas where authorities require the use of robots - such as handling highly radioactive material - those currently in use are mostly teleoperated robots used for inspection, surveillance, and monitoring. Few robots now in use are sophisticated enough for O&M tasks and most depend on human control, usually from a remote location.

Utilities' experience using robots has been compiled by the Utility/Manufacturer Robot Users Group (U/M RUG). U/M RUG asked utilities to give details of all their robotic applications, in particular those where there were several options for carrying out the job. The results of the survey were published in August 1991. From the survey and from discussions at regular U/M RUG meetings, it is possible to see how robot use and the robotics industry have developed.

Until the 1980s, robot development was mostly carried out by utilities as part of their in-house design work. Simple tools like master-slave manipulators were developed for use in reprocessing, post-irradiation analysis, waste management, and R&D applications - areas where direct human operation was impossible. The expansion in robot applications depended initially on advances in other fields such as computing, but by the 1980s robots were being developed to carry visual imaging equipment and the U/M RUG survey reveals that by 1986 such inspection tools were being used by some utilities.

Future Trends - Harry T. Roman of U/M RUG has summarized the current status of robot use and development. Robots are mandatory in some inspection tasks and are used as the best option in others. In some inspection areas, such as underwater work, use of robots is growing quickly, while in others such as piping inspection, it is already widely used. Robot use is also growing in environmental monitoring, especially in controlled radiation areas, and in cleaning of reactor internals such as steam generators and pressure vessels.

Present research attempts to replicate the benefits of a human worker. Precision positioning, dexterity, intelligence, and mobility are all being investigated and developed. Utilities, however, have reserved judgment on such developments until they are proven in use. Their own efforts are still directed toward inspection, miniaturization of proven devices, and improved imaging in low light levels.

The use of robots is a relatively new feature in the maintenance of power plants, but Public Service Electricity & Gas calculates that it has saved $2 for every $1 invested in robotics. More robots, in more applications, look certain, not only because of new products, but because of such favorable economics.

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