

# Research on Radioactive Aerosol Control and Decontamination at Fukushima Daiichi Nuclear Power Station Decommissioning

## (2) Characterization and scavenging of aerosols generated by Laser cleaning experiment

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### Abstract

The effective confinement and scavenging of radioactive aerosols are critical in minimizing the risk of radiation exposure during decommissioning. We are trying to understand the generation and dispersion patterns of these aerosols for the execution of decommissioning activities. The aerosol particles generated during the laser decontamination process were confined and captured utilizing a spray and mist system.

**Keywords:** decommissioning, laser decontamination

### 1. Introduction

A Japanese Nuclear Regulation Authority report highlights high radiation levels in Fukushima Daiichi NPP's containment buildings [1]. A study proposes water mist and spray during laser decontamination to control radioactive aerosol dispersion. Successful implementation could aid decommissioning, eliminate hotspots, and enhance safety, potentially extending electronic device operation in high-dose environments and aiding in the cleanup of contaminated structures.

### 2. Results and Discussion

Water mist before spray injection improved the efficiency of removing aerosol particles on Stainless-Steel surfaces, as depicted in Fig. 1(a). Fig. 1(b) illustrates the irradiated surface image captured using the keyence 3200 surface profilometer after 30 s of laser irradiation using 1.5 kW power.

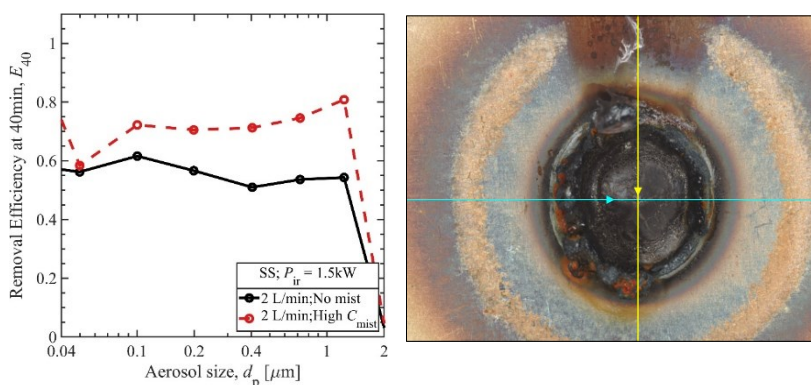


Fig. 1. Effect of a) mist on the removal efficiency and b) laser irradiated surface

### 3. Conclusion

The experimental work demonstrates that combining mist and spray improves aerosol removal efficiency in laser cleaning, offering valuable insights to remove radioactive aerosols. The study's results can contribute to optimizing spray system design for efficient aerosol scavenging during the decommissioning of Fukushima Daiichi.

### References

[1] Investigation and analysis of TEPCO's Fukushima Daiichi NPS Accidents (2022), OECD/NEA International Conference on Regulator's Views and Priorities on Nuclear Safety and Radiation Protection 10 Years After TEPCO Fukushima Daiichi NPS Accident.