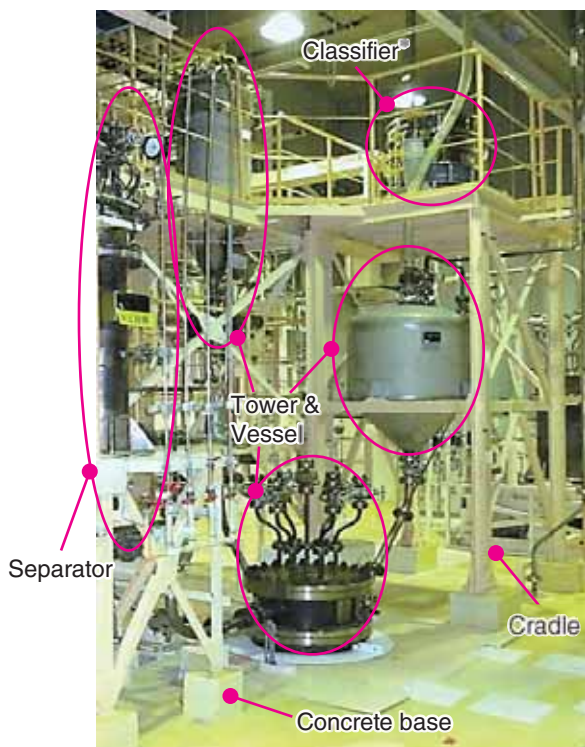


## 8-1 Toward an Optimized Decommissioning Plan

- Development of Formula to Evaluate Manpower Requirements for Dismantling Nuclear Facility -



\* Here, "Classifier" is categorized as "Crusher."

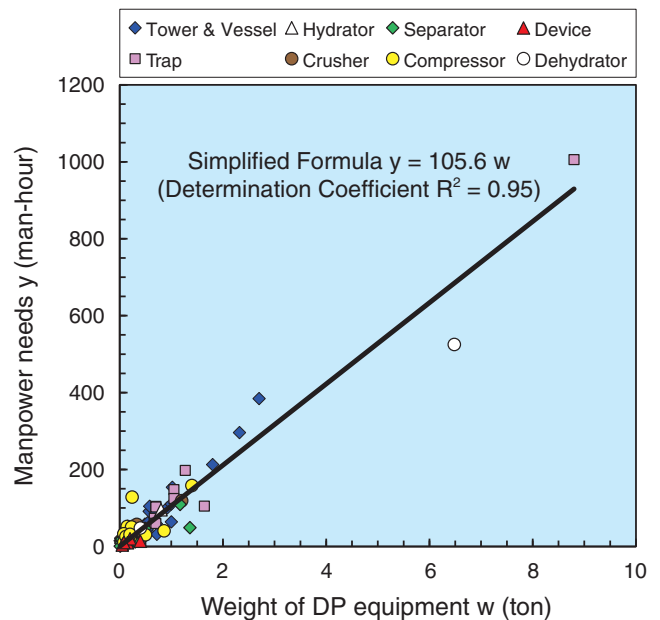
**Fig.8-4 Typical DP equipment and its state before dismantling**

All DP equipment was contaminated with U compounds and installed in "Cradle" or on "Concrete base."

Nuclear facilities are dismantled when their mission is complete. To implement effective dismantling, we are setting up a system to estimate a priori project management data such as cost, manpower requirements, exposure dose, and waste generation. This system uses formulas established by analyzing data collected during previous dismantling projects.

The formulas to determine the manpower requirements for dismantling the equipment, for example, were represented by linear approximations with the equipment weight according to the equipment type. We have already confirmed that these formulas are applicable to a research reactor, but not to other types of nuclear facilities. Therefore, we verified the formulas for use with one of the uranium (U) handling facility: the U Refining and Conversion Plant (URCP).

At the URCP, many types of equipment were dismantled, such as "Tower & Vessel," "Trap," "Crusher," "Separator," and "Compressor." The correlation between equipment weight and manpower required for dismantling were analyzed, revealing that the formulas for the type of equipment could



**Fig.8-5 Correlation between the weight of DP equipment and manpower requirements for dismantling DP equipment**  
Almost all types of DP equipment were dismantled by the similar procedure. Because of this, the manpower requirements for dismantling these types of DP equipment could be estimated by one simplified formula with high accuracy, although the number of data or their range for each type of DP equipment was limited.

be also applied to the URCP. However, few actual data were collected for some types of equipment that making formulas for these was impossible. Moreover, some formulas had low accuracy because every equipment was very light and the distribution of data was localized.

Therefore, we considered grouping the actual data together for equipment that had similar installation and dismantling procedures. In this case, we determined that most types of dry conversion process-related equipment (DP equipment) used to run U powder inside were supported by "Cradle" and "Concrete base" (Fig.8-4) and were dismantled by a similar procedure. Because of this, a simplified formula was fit to these types of DP equipment (Fig.8-5). The simplified formula depends on the total weight of the DP equipment and accurately provides the manpower requirements for dismantling all DP equipment.

We are currently developing an appropriate formula as per the type of nuclear facility, and improve the system to the useful one to optimize the decommissioning plan.

### Reference

Izumo, S. et al., Development of Evaluation Models of Manpower Needs for Dismantling the Dry Conversion Process-Related Equipment in Uranium Refining and Conversion Plant (URCP), Proceedings of the ASME 2013 15th International Conference on Environmental Remediation and Radioactive Waste Management (ICEM 2013), Brussels, Belgium, 2013, ICEM2013-96097, 9p., in CD-ROM.