報　文

# 高炉スラグ微粉末を利用した磁選による
# 放射性セシウム汚染土壌の乾式分級

白石　祐彰[1*]、　樫木　正成[2]、　三苫　好治[3]

[1] 株式会社奥村組　技術研究所（〒 300-2612 茨城県つくば市大砂 387）

[2] 株式会社奥村組　東日本支社土木工務部（〒 108-0014 東京都港区芝 5-6-1）

[3] 県立広島大学（〒 727-0023 広島県庄原市七塚町 562）

## Dry Classification of Radioactive Cesium Contaminated Soil by Magnetic Selection
## Using Blast Furnace Slag Fine Powder

Hiroaki SHIRAISHI[1*], Masanari KASHIKI[2], and Yoshiharu MITOMA[3]

[1]Technical Research Institute, Okumura Corporation (387 Ohsuna, Tsukuba, Ibaraki300-2612, Japan)

[2]Civil Engineering Division, East Japan Branch Office, Okumura Corporation

(5-6-1 Shiba, Minato-ku, Tokyo 108-0014, Japan)

[3]Faculty of Life and Environmental Science, Prefectural University of Hiroshima

(562 Nanatsuka-cho, Shobara, Hiroshima 727-0023, Japan)

### Summary

Finer soil particles tend to be associated with greater contamination concentration by radioactive cesium. Classification treatment, which means separating fine-grained contaminated soil from coarse grained soil satisfying reference values, allows reuse of coarse-grained soil. Wet classification with water has been conducted for contaminated soil. However, cohesion precipitation processing of the turbid water generated by wet classification becomes difficult as the particle sizes of the fine particles become smaller. As the properties of the turbid water change, cohesion precipitation processing becomes unstable. Using simulated cesium contaminated soil, we explored a dry classification testing method that does not produce any wastewater. Using ground granulated blast-furnace slag as a magnetic material, after magnetic separation using two-step lattice type magnet, We found that about 20 wt% of the sample was classified as magnetized fine fraction which had more cesium concentration by about 2.7 times than the sample without the classification treatment. Subsequent tests assessed radioactive cesium contaminated soil using a drum-type magnetic separator to separate fine and coarse fractions. The results indicated the radioactive cesium concentration in the coarse fraction samples had dropped by between 39% and 46%. The number of execution processes of dry classification was comparatively less than wet classification, so the flow of classification processes of contaminated soil at fields can be simplified.

**Key Words:** Radioactive cesium contaminated soil, Ground granulated blast-furnace slag, Dry classification, Magnetic sorting, Drum-type magnetic separator

和 文 要 約

　放射性セシウム汚染土壌は土粒子が小さいほど汚染濃度が高くなるため、細粒土からなる汚染土壌と基準値を満たす粗粒土を分けること（分級処理）により、粗粒土は再生利用ができる。従前は、水を使用して汚染土を湿式分級していた。しかし、湿式分級で発生する濁水は、細粒分の粒径が小さくなると凝集沈殿処理が難しくなり、濁水の性状が変化すると凝集沈殿処理は安定しない。そこで、全く廃水を出さない、模擬セシウム汚染土壌の乾式分級試験方法を検討した。高炉スラグ微粉末を磁性材料として用い、2段式格子型マグネットで磁力選別した結果、磁着試料（細粒分）は分級前の約 2.7 倍のセシウム濃度となり、分級前の約 20％の重量に濃縮できた。次に、放射性セシウム汚染土壌で試験を実施し、ドラム型磁選機により細粒分と粗粒分に分級した結果、粗粒分は試料の放射性セシウム濃度に対して 39 〜 46％に低下した。乾式分級の処理プロセス数は湿式分級よりも比較的少なくでき、実現場における汚染土壌の分級処理の流れが単純になった。