Core disking and "rockburst" in soft tuffaceous rock masses of Yotsuyaku Formation at Iwale Tunnel, northeastern Japan

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Abstract:
Core disking and tunnel deformation like rockburst have occurred at softy tuffaceous rock masses at a point 220 meters deep from the surface in Iwate Tunnel. The physical properties suggest that these rock masses have the possibility of swelling. The estimated earth pressure affecting a drilling hole is larger than five times the tensile strength of the rocks, which is considered to be a condition to cause core disking. Plate-shaped rock fragments continuously raveled like rockburst from the face of this tunnel, and deformation at the wall exhibited plasticity. The magnitude of these tunnel deformations is not influenced by either overburden or physical properties of rock masses, but mainly by geological structure.

Resume:
Des deritation de carottes et des deformations de tunnel comme par exemple des eclats de roche sont apparues dans les masses rocheres tendres et tufacees du tunnel d'Iwate it 220 metres de profondeur. Les caracteristiques physiques de la roche suggerent la possibilite d'un gonflement. La pression du terrain au niveau du trou de sondage est cinq fois plus importante que la resistance it la traction de ces roches, ce qui explique ces deritations de carottes. Les chutes repetitives de fragments rocheux plats qui se detachent du front de taille ainsi que la deformation des parois laterales revelent une certaine plasticite. L'ampleur de ces deformations n'est directement liee ni aux terrains de couverture, ni aux caracteristiques physiques de ces masses rocheuses, mais principalement it la structure geologique du terrain.

Keywords: Triassic to Jurassic slate and sandstone; Permian limestone and chert; Physical properties of tuffaceous rock of Yotsuyaku Formation; Results of horizontal boring and disking of drilling core; Correlation between disking and physical properties; Condition to cause core disking; "Rockburst" in softy tuffaceous rock mass; Correlation between tunnel deformation and rock properties; Influences of geological condition to tunnel deformation; Core disking.