

Practical Aspects Related to Rock Stress Determinations Using the Deep Doorstopper Gauge System (DDGS)

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Abstract:

In 1996, the common efforts of Atomic Energy of Canada Limited (AECL) and Ecole Polytechnique de Montreal extended Leeman's application of the doorstopper cell to deep water-filled boreholes with the Deep Doorstopper Gauge System. Field trials with this system indicated that consistent bonding of the cell underwater was a problem. Consequently, semi-quantitative tests were conducted in the laboratories of Ecole Poly technique to identify a potential adhesive. During the fall of 1998, a field testing program was undertaken at AECL's Underground Research Laboratory to evaluate the performances of the selected adhesive. The test results confirmed that the Versilok 410/17 performed well in the actual field conditions. Moreover, the influence of hydrostatic pressure on the strain gauge response required investigation. Triaxial laboratory tests were conducted at Ecole Poly technique and showed that hydrostatic pressure less than 6.2 MPa has a negligible effect on the cell's response.

Resume: En 1996, l'Energie Atomique du Canada Limitee (EACL) et l'Ecole Polytechnique de Montreal ont mis au point le « Deep Doorstopper Gauge System », une methodologie de mesure de contraintes a grande profondeur basee sur l'utilisation de la cellule du « Doorstopper » de Leeman. Toutefois, certaines difficultes de collage des cellules de mesure sous l'eau furent rapidement identifiees. Suite a un programme d'essais en laboratoire, un adhesif potentiel a ete identifie. En octobre 1998, les performances de l'adhesif retenu ont ete verifiees lors d'essais *in situ* au Laboratoire Souterrain d'EACL. Les resultats obtenus confirment que le Versilok 410/17 reagit adequatement en conditions d'essais. Par la suite, une etude a permis d'analyser l'influence de la pression hydrostatique sur la reponse des jauges. Des essais triaxiaux realises aux laboratoires de l'Ecole Polytechnique demontrent qu'une pression hydrostatique inferieure a 6.2 MPa a un effet negligeable sur la lecture des jauges.

Keywords: Deep Doorstopper Gauge System (DDGS); adhesive investigation; viscosity, pot life and cutting period; mechanical strength; ability to transmit strains; field testing program; water pressure effects on the DDGS.