Influence of discontinuity on overbreaks and underbreaks in rock excavation — case study from Beris Dam, Kedah, Malaysia

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Rock blasting excavation is largely controlled by discontinuities and the strength of the rock materials, although blasting factors are also equally important. This paper presents a case study from the Beris Dam project in Kedah, where a geologist was called upon to clarify a dispute between the contractor and engineers that excessive overbreaks at the Spillway and along the toe slab of the Main Dam were largely attributed to geological factors. To verify this issue, detailed mapping on the geological structures was carried out on the resulting exposures. Focus of the mapping was mainly on observing the nature of the rock failures (overbreaks) and collection of discontinuity data (joints, bedding, shear zones, fault). The discontinuity data were analysed kinematically by using stereographic projection to verify the mode of rock breakage. Results of the analyses indicated and conformed with the field evidences, that the overbreaks were clearly controlled by the unfavourable intersections of the bedding planes, joints, faults and shear zones with respect to the blasting lines. Overbreaks in the Spillway and the Main Dam usually occurred in wedge and planar mode of failures.

Kerja-kerja penggalian batuan sangat dipengaruhi oleh ketakselanjaran dan kekuatan bahan batuan, walaupun diakui bahawa dan faktor-faktor peletupan juga berperanan penting. Kertas kerja ini cuba menyajikan suatu contoh kajian kes daripada projek Empangan Sg. Beris, Kedah. Di dalam projek ini geologis profesional telah diundang untuk mengesahkan bahawa kejadian terlebih korek yang berlaku di tapak alur limpah dan kaki empangan utama disebabkan oleh faktor-faktor geologi. Untuk mengesahkan punca kepada masalah ini, pemetaan terperinci telah dijalankan di tapak-tapak berkenaan.

Pemetaan geologi tersebut tertumpu kepada pencerapan keadaan kegagalan bantuan dan pengumpulan data-data ketakselanjaran (kekar, perlapisan, sesar dan zon ricih). Data-data orientasi ketakselanjaran telah dianalisis secara kinematik dengan menggunakan unjuran stereografi untuk melihat potensi ragam kegagalannya. Hasil analisis jelas menunjukkan bahawa kejadian terlebih korek memang dikawal oleh ketakselanjaran kerana orientasi garis letupan batuan yang dipilih mendedahkan potongan cerun batuan kepada kegagalan baji dan satah.