

INTISARI

Salah satu item pekerjaan yang menjadi fokus utama dalam Proyek Pembangunan Bendungan Bener yakni pekerjaan terowongan pengelak. Metode konstruksi yang diterapkan dalam pekerjaan terowongan pengelak Bendungan Bener yakni metode *New Austrian Tunneling Method* (NATM). Metode ini mengintegrasikan formasi tanah dan batuan serta menggunakan sistem proteksi dalam proses konstruksi. Penelitian ini bertujuan untuk menganalisis lebih dalam serta menyusun rancangan pemeliharaan terowongan pengelak baik selama proses konstruksi maupun pasca konstruksi.

Penelitian dilakukan dengan mengobservasi terlebih dahulu proses pelaksanaan konstruksi terowongan. Pelaksanaan konstruksi disesuaikan dengan spesifikasi teknis, dokumen kontrak, instruksi kerja, serta persyaratan lain yang telah disepakati. Ketidaksesuaian prosedur, material, maupun tenaga kerja dapat mempengaruhi mutu pekerjaan sehingga perlu dilakukan *quality assurance* (QA) dan *quality control* (QC). Selain penjaminan mutu, perlu pula adanya penjaminan keselamatan dan kesehatan kerja (K3). Pada penelitian ini, penjaminan K3 dianalisis menggunakan metode *hazard identification risk assessment and risk control* (HIRARC). Adapun rancangan pemeliharaan yang dilakukan pada penelitian ini untuk menghindari kegagalan konstruksi pada terowongan pengelak.

Berdasarkan analisis dan peninjauan yang telah dilakukan, sistem proteksi yang digunakan dalam konstruksi terowongan pengelak yakni *wiremesh*, *shotcrete*, *rockbolt*, dan *steel support*. Material utama yang dibutuhkan yakni *wiremesh* 1735 lembar, angkur besi ulir D10 5431 batang, campuran *shotcrete* 1966,65 m³, *rockbolt* 3967 set, serta 252 *steel support*. Adapun penjaminan K3 berdasarkan metode HIRARC didapatkan hasil sesudah dilakukan pengendalian risiko yakni tidak ada risiko bahaya dengan *risk rating* kategori *extreme*, 1,25% *risk rating* kategori *high*, 43,75% dengan *risk rating* kategori *moderat*, serta 55% *risk rating* kategori *low*. Lebih lanjut, pemeliharaan pada terowongan pengelak perlu dilakukan pada masa konstruksi dan pasca konstruksi.

Kata Kunci : NATM, Metode HIRARC, Pemeliharaan Terowongan

ABSTRACT

The main focus in the Bener Dam Construction Project is diversion tunnel work. Construction method which is applied in the Bener Dam is New Austrian Tunneling Method (NATM). This method integrates soil and rock formations and uses a protection system in the construction process. This study aims to analyze more deeply and develop a maintenance plan for diverting tunnels both during the construction and post-construction processes.

The research was conducted by observing the tunnel construction process. Construction implementation is adjusted to technical specifications, contract documents, work instructions, and other agreed requirements. Discrepancies in procedures, materials, and labor can affect the quality of work, so quality assurance (QA) and quality control (QC) is necessary. In addition to quality assurance, it is also necessary to guarantee occupational safety and health. In this study, guarantees were analyzed using the hazard identification risk assessment and risk control (HIRARC) method. The maintenance design carried out in this study is to avoid construction failures in diversion tunnels.

Based on the analysis and review that has been carried out, the protection systems used in the diversion tunnel construction are wiremesh, shotcrete, rockbolt, and steel support. The main materials needed are 1735 pieces of wiremesh, 5431 threaded D10 rod anchors, 1966.65 m³ of shotcrete mixture, 3967 sets of rockbolt, and 252 steel supports. As for safety and health guarantee based on the HIRARC method, the results obtained after carrying out risk control are that there is no hazard risk with an extreme risk rating category, 1.25% risk rating in the high category, 43.75% with a moderate risk rating category, and 55% risk rating in the low category. Furthermore, maintenance of the diversion tunnel needs to be carried out during construction and post-construction.

Keywords : NATM, HIRARC Method, Tunnel Maintenance