

PERBANDINGAN EFISIENSI BIAYA ANTARA DINDING PENAHAN TANAH BATU BRONJONG DAN BETON PADA PROYEK JEMBATAN

**(Studi Kasus : Pembangunan Jembatan Sei Peniti Desa Tenggau
Kecamatan Pinggir)**

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ABSTRAK

Pemilihan jenis dinding penahan tanah pada proyek jembatan umumnya masih didasarkan pada biaya konstruksi awal sehingga belum mencerminkan biaya selama umur layanan struktur. Penelitian ini bertujuan membandingkan efisiensi biaya antara dinding penahan tanah batu bronjong dan beton kantilever pada Proyek Jembatan Sei Peniti, Desa Tenggau, Kecamatan Pinggir, Kabupaten Bengkalis menggunakan metode *Life Cycle Cost* (LCC). Penelitian dilakukan melalui perhitungan *Quantity Take Off* (QTO), Analisis Harga Satuan Pekerjaan (AHSP), penyusunan Rencana Anggaran Biaya (RAB), serta analisis *Life Cycle Cost* yang meliputi *initial cost*, *maintenance cost*, *demolition cost*, dan *salvage value*. Analisis dilakukan selama periode evaluasi 300 tahun dengan tingkat eskalasi 2% dan tingkat diskonto (*Weighted Average Cost of Capital*) sebesar 5,97%. Hasil penelitian menunjukkan bahwa RAB dinding penahan tanah kantilever sebesar Rp 1.870.814.509,97. Total *Life Cycle Cost* dinding penahan tanah batu bronjong sebesar Rp 2.982.075.221,14, sedangkan dinding penahan tanah kantilever sebesar Rp 2.146.460.306,50, sehingga diperoleh penghematan biaya sebesar Rp 835.614.914,64. Proporsi biaya terbesar pada kedua alternatif berasal dari *initial cost*, yaitu 92,5% pada dinding penahan tanah batu bronjong dan 92,2% pada dinding penahan tanah kantilever. Proporsi *maintenance cost* masing-masing sebesar 7,2% dan 7,7%, sedangkan kontribusi *salvage value* sebesar 2,7% dan 0,3%. Dengan demikian, meskipun memerlukan investasi awal lebih tinggi, dinding penahan tanah kantilever menghasilkan biaya siklus hidup lebih rendah sehingga menjadi alternatif yang lebih efisien dan ekonomis untuk proyek jembatan.

Kata kunci : Bronjong, Dinding Penahan Tanah, Efisiensi Biaya, Kantilever, *Life Cycle Cost* (LCC), Jembatan.

COST EFFICIENCY COMPARISON BETWEEN GABION AND REINFORCED CONCRETE CANTILEVER RETAINING WALLS IN A BRIDGE PROJECT

(Case Study: Construction of the Sei Peniti Bridge, Tenggana Village, Pinggir District, Bengkalis Regency)

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ABSTRACT

The selection of retaining wall types in bridge construction projects is generally based on initial construction costs, which do not fully reflect the costs incurred throughout the service life of the structure. This study aims to compare the cost efficiency of gabion and reinforced concrete cantilever retaining walls in the Sei Peniti Bridge Project, Tenggana Village, Pinggir District, Bengkalis Regency, using the Life Cycle Cost (LCC) method. The research was conducted through Quantity Take-Off (QTO) calculations, Unit Price Analysis (AHSP), Bill of Quantities (BOQ) preparation, and Life Cycle Cost analysis, including initial cost, maintenance cost, demolition cost, and salvage value. The analysis was carried out over a 300-year evaluation period using an escalation rate of 2% and a discount rate (Weighted Average Cost of Capital) of 5.97%. The results show that the initial construction cost of the cantilever retaining wall was Rp 1,870,814,509.97. The total Life Cycle Cost of the gabion retaining wall was Rp 2,982,075,221.14, while that of the cantilever retaining wall was Rp 2,146,460,306.50, resulting in a cost saving of Rp 835,614,914.64. The largest cost component for both alternatives was the initial cost, accounting for 92.5% of the total cost for the gabion retaining wall and 92.2% for the cantilever retaining wall. The maintenance cost accounted for 7.2% and 7.7%, respectively, while the salvage value contributed 2.7% and 0.3%, respectively. Therefore, although the cantilever retaining wall requires a higher initial investment, it results in a lower life cycle cost, making it a more efficient and economical alternative for bridge construction projects..

Keywords : *Bridge, Cost Efficiency, Gabion Retaining Wall, Life Cycle Cost (LCC), Reinforced Concrete Cantilever Retaining Wall.*