CCX™
Innovation on a Roll

CHANNEL LINING

Project Info

- 25/ 07 / 23
- CCX-MAT® (CCX-M®) Bulk Rolls
- 10,540m²
- Transverse layers
- Jragung Dam Diversion Channel, Semarang, Java, Indonesia
- Client:Ministry of Public Work & Housing Indonesia

  Sub-Contractor: PT Prima Minechem Indonesia.
- Providing erosion control and mitigating water seepages to a diversion channel.

PT. PRIMA MINECHEM INDONESIA

Completed installation

In July 2023, Concrete Canvas Ltd's CCX-MAT® GCCM (CCX-M®) was used to line and provide erosion control to a water diversion channel in Semarang, Java, Indonesia.

The channel was designed to be a temporary structure with the aim to block and divert water run-off from the project site, with further plans to fully submerge the channel within 2 years. As part of the design, the channel needed to be lined to prevent erosion of the structure and water seepages into the surrounding area.

Traditional poured concrete was suggested to line the channel. However, due to the scale and remoteness of the project it was proven that using poured concrete would have pushed the project over budget - with majority of the costs spent on logistics, material, specialist equipment and labour. Shotcrete was considered and initially used for lining the channel but failed due to the material being unable to adhere to the existing soil. CCX-M® was specified for the project because of the ease and speed in which it can be transported and installed alongside needing minimal equipment and team to install therefore reducing overall costs.

CCX-M® is a Type II GCCM as defined in ASTM D8364 - Standard Specification for GCCMs. CCX-M® is suitable for lining hydraulic structures with both soil and solid subgrades and was chosen for this project to suit the abrasion and loading requirements.

*Geosynthetic Cementitious Composite Mat

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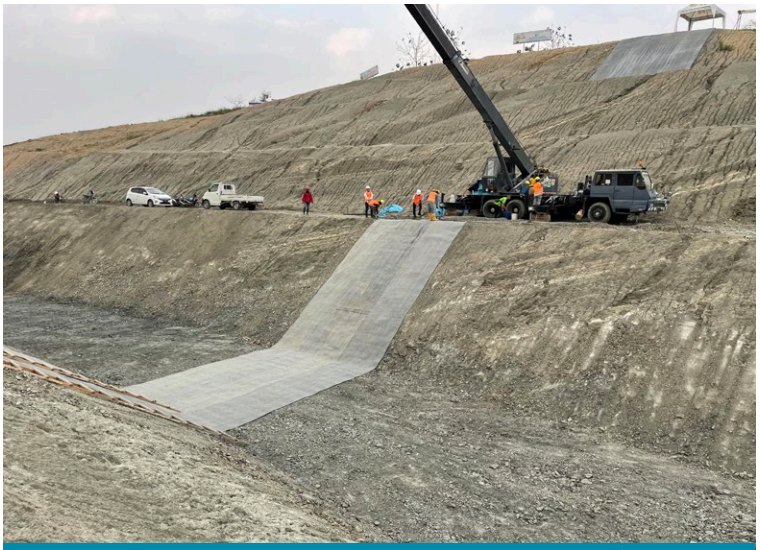
Channel excavated to specification

Anchor trenches dug at the shoulder of the channel

CCX-M® laid transverse across the channel



Crane used to deploy CCX-M® transversely

CCX-M® secured within anchor trenches

Anchor trenches backfilled with non-erodible fill

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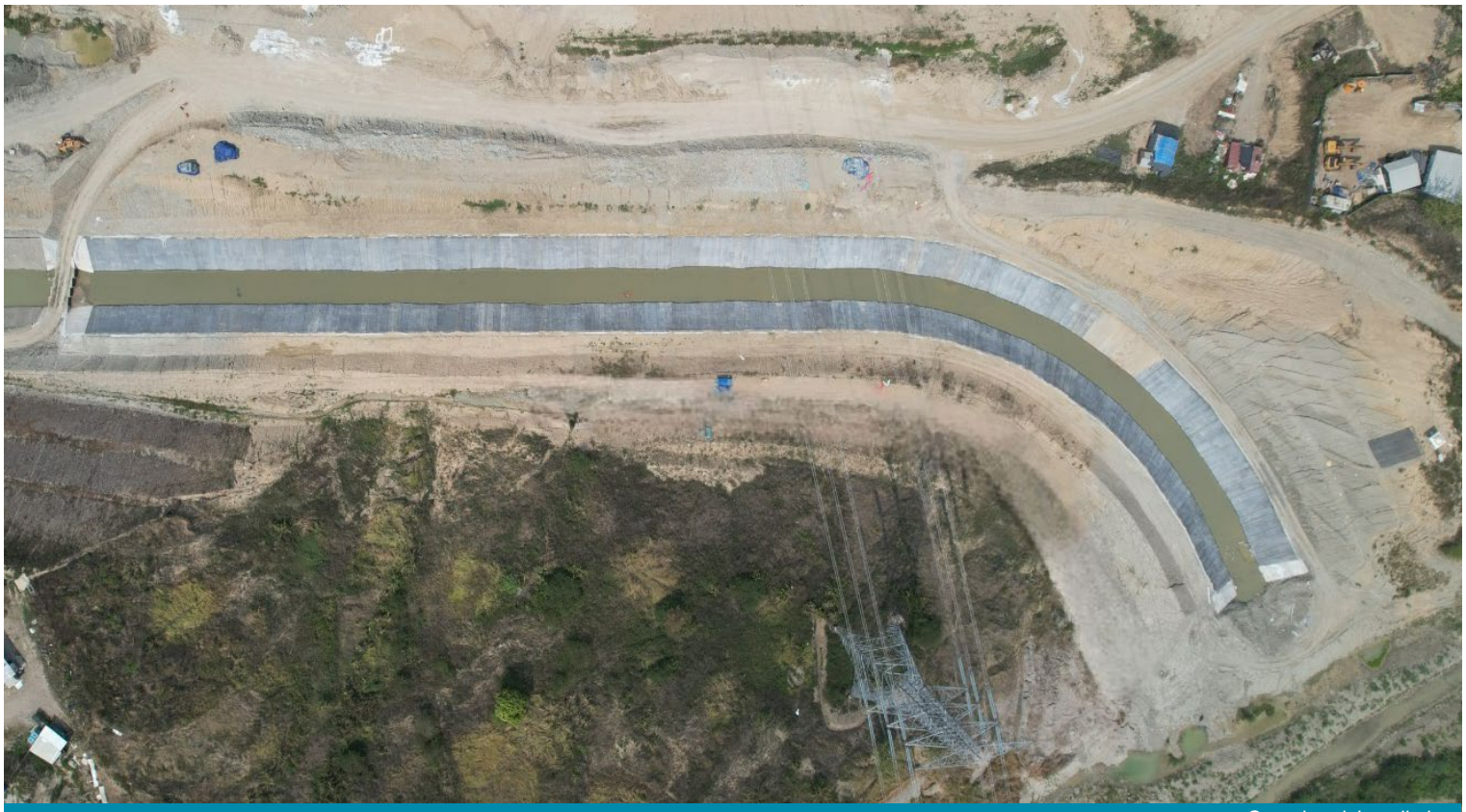

Completed Installation

Prior to installation, the channel was first excavated and prepared to specification. The 360m long channel profile was dug with an invert width of 7m, top width approximately 22.5, and side slopes of 1:1.5. Any sharp or protruding rocks were removed and local soil was used to create a smooth and uniform surface. Anchor trenches located at the shoulders, upstream and downstream of the channel were excavated prior to install.

Once the channel was excavated to specification, Bulk Rolls of CCX-M® were brought to site and lifted into place using a crane with a spreader beam attachment. Using the boom arm, the CCX-M® material was laid transversely across the width of the channel. The material was cut to length using basic hand tools with both ends of the material then encapsulated within anchor trenches.

Each layer of CCX-M® was overlapped by 100mm to the blue overlap marker line, with each joint secured using stainless steel screws spaced every 100mm and 50mm from the material edge (along the blue marker line). Intermediate fixings were installed under the overlap joints as part of larger structure intermediate detailing, with two pegs secured in the invert and two on each of the side slopes. At the channel shoulders, the CCX-M® was pegged down at every overlap joint within anchor trenches and then backfilled with non-erodible fill. Once secured, the material was hydrated after every shift using a hose and water pumped from a nearby stream.

Due to the speed and ease of application, CCX-M® was installed at an average rate 700m^2 per day (7 hours shifts) by a team of 9 installaters. The project was deemed a success by clients The Ministry of Public Works & Housing Indonesia and sub-contractors PT Prima Minechem Indonesia, with the project being completed ahead of schedule.

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