



SIKA AT WORK

PATRIND HYDROPOWER PROJECT, AZAD KASHMIR

**CONCRETE & REFURBISHMENT SOLUTION AT
TUNNELS & BRIDGES**

BUILDING TRUST



PATRIND HYDROPOWER PROJECT, AZAD KASHMIR

CONCRETE ADMIXTURES, ADHESIVES & REPAIR MORTARS, SHOTCRETE ADMIXTURES & INJECTION SYSTEM

Project:

Patrind Hydropower Plant is a run-of-the-river, high head project of 757 metres (2,484 ft), located on Kunhar River near Patrind Village right on the border of Abbottabad District of Khyber Pakhtunkhwa Province and Muzaffarabad city of Azad Kashmir, Pakistan. 150 megawatts (200,000 hp) Patrind Hydropower Plant, which will be the second private hydro power project in Pakistan. The project would generate 150 megawatts of electricity which would not only help improve the electricity voltage in Abbottabad and Mansehra districts but also boost economic activities in the region.

Project Requirements:

The plan of the Project is to divert the waters of river Kunhar through a weir, located near village Patrind, and a left bank conveyance system of headrace tunnel to the right bank of river Jhelum, near the city of Muzaffarabad, where a powerhouse is being built. Sika has successfully shown its presence on projects of economic importance over the course of time. Client demanded high performance solutions in concrete and refurbishment at this project. Different Concrete admixtures were demanded for different classes of mass concrete at the project. High range water reducers were demanded for early strength of the concrete. In conjunction with this, third generation self-compacting concrete was also required by the client. Liquid shotcrete admixture in addition to dry shotcrete admixture was also needed to meet different requirements in tunnels and also for rock and slope stabilization. Furthermore, epoxy resin adhesive and repair mortar was required for tunnels and bridges. Multipurpose epoxy grout was also demanded for grouting of base plates of heavy machinery at the power house. High performance water resistant bonding agent and mortar improver was also required by the client. In addition to this, mould release agent was demanded for shuttering in the tunnel. Expanding grout admixture was also demanded for tunnel linings. Lastly, client faced the issue of water leakages in powerhouse basement to counter that problem they PUR-Injection system was demanded for water stoppage at the project.



Sika Solutions:

In light of all the requirements Sika suggested renowned concrete solutions and refurbishment solutions at Patrind hydropower project. Sigunit L-15 AF 11 alkali free liquid shotcrete admixture was suggested in tunnel and slop stabilization in mountains. Sigunit L-15 AF 11 is used for shotcrete with high initial strengths, Underground linings and rock and slope stabilization. In conjunction with this, Sigunit Powder BA was recommended which is a ready-to-use accelerator and waterproofing agent in powder form for addition to the dry gunite mix. Sigunit Powder BA is suitable for dry spray gunite mortar which was also used in tunnels. Sigunit Powder BA reacts in the mix to assist the hydration process, resulting in rapid setting and greatly accelerated strength development within the first 24 hours. It also provides better adhesion to areas of slight seepage. In order to meet the demand of different classes of concrete admixture for mass concrete Sika offered a combination of admixtures ranging from high range water-reducing and set retarding concrete admixture to third generation superplasticizer. Sikament-512 PK is a highly effective water-reducing agent and superplasticizer for the production of high quality for high early strengths. Sikament-NN was suggested to be used as a substantial water-reducing agent for promoting high early and ultimate strengths. Finally, Sika ViscoCrete-3110 was suggested it's a third generation superplasticiser for concrete and mortar. It is particularly developed for the production of high flow concrete with exceptional flow retention properties. Sika ViscoCrete-3110 facilitates extreme water reduction, excellent flow ability with optimal cohesion and strong self-compacting behavior. Going further, Sikadur-31 CF Slow was given at the project its two-component adhesive and repair mortar based on a combination of epoxy resins and specially selected high strength fillers. Sikadur-31 CF Slow was suggested both as an adhesive and also as a repair mortar for tunnel and bridges. With this, Sikadur-42 MP Slow was recommended for grouting of heavy machinery bases. Sikadur-42 MP Slow is a three-component, multi-purpose, solvent-free, moisture tolerant, epoxy grouting system. Moreover, Sika Latex was suggested as a bonding agent it's a high performance water resistant bonding agent and mortar improver. Sika Mould BA was further recommended as an anti-corrosive shutter release agent. Sika Mould BA is a blend of refined mineral oils and anticorrosive additives in concentrate form producing a thin-film release agent. When diluted and applied to steel, timber or plastic formwork allows for clean, fast and easy striking. Intraplast Z was used as an expanding grout admixture. It is used to increase cohesion in cement grouts. Intraplast Z improves fluidity and cohesion. Lastly, Sika Injection system i.e Sika Injection-101 and Sika Injection 201 were suggested to stop the water leakage in the basement of powerhouse at Patrind Hydropower plant. Sika® Injection-101 is Tough-elastic PUR-Injection foam which is used for the temporary waterstopping of high water intrusions in cracks, joints and cavities in concrete, brickwork and natural stonework. Sika® Injection-201 is a very low viscous Flexible PUR-Injection resin for permanent watertight sealing.



Project Name: Patrind Hydropower project,
Azad Kashmir

Consultant: PES Pakistan Engineering Services

Contractor: Daewoo E & C, Kiyun Dong, Sangbu