

WORK REPORT

Customer : Commonwealth Utilities Corp

End User : Saipan Main Power Plant

Location : Lower Base, Saipan
Northern Marianas Island

Project : Foundation repair
Anchor bolts replacement
RegROUT
Re-alignment & re-chocking

Equipment: Mitsubishi-Man Diesel Engine
18V52/55B

Work Period: August – September 2016



Alphatec-Engineering reports successful completion of repairs to the foundations of a Mitsubishi-MAN diesel engine, type 18V52/55B, at the CUC (Commonwealth Utility Corporation) power plant on the island of Saipan, the largest of the islands that comprise the Commonwealth of the Northern Mariana Islands, located in the middle of the Pacific Ocean



Alphatec team

The engine in question drives a brushless alternator of 13 MW capacity. It was originally installed in 1989. Even though it is not oldest of the units at the site, this one, unit 5, developed vibration problems, forcing a reduction in engine speed to avoid major damage, and resulting in decreased efficiency.

Eventually the vibration problem became so acute that the engine was shut down, giving the opportunity to Alphatec to do what they have been doing for almost 40 years, fix foundations.

The project involved mobilization of a highly experienced team, including specialists in diamond core drilling and diamond wire cutting.

Because of the remote location, all materials & equipment required to complete the repair work, with the exception of reinforcing steel and ready-mixed concrete, had to be shipped to the island.



Saipan unit 5, diesel engine plus alternator

The first step was cutting out, by diamond wire, of concrete on both sides of the engine foundation, in the form of twelve blocks (total volume 32 m³), allowing the existing 2.31 m long anchor bolts to be chipped out and removed. Next, new 3.2 m long anchor bolts were set in place (21 on each side).



Formwork was installed to contain the first pour of epoxy grout, Alphatec 800, which embedded the lower 1000 mm of the anchor bolts.



After 24 hours of curing, the first batch of replacement concrete, up to one meter below floor level, was poured. Prior to that a layer of Alphatec 440 epoxy bonding agent was applied to all surfaces to ensure adherence between the existing and new concrete. Then a further grout of Alphatec 800 was poured into the anchor bolt cavities to a level 15 cm below the base frame of the engine.

After curing, Alphapad (hydraulic jack units) were set in place to take the weight of the engine and the engine frame was aligned. A second pour of replacement concrete was then done, bringing the level up to 280 mm below floor level. Finally, Alphatec 800 epoxy grout was poured to floor level.



Alphapads holding the engine frame



"Cold joint" that became apparent following Pressure injection

A series of injection holes was drilled alongside the engine and alternator foundation, to a depth of 3.6 m, and Alphatec 342 epoxy resin pressure injected, repairing the "cold joint" that became apparent just above the 45° sloping part of the foundation, as well as other separations and stress cracks, raising the effective damping inertia of the foundation.

Finally, the engine crankshaft was aligned using a digital web deflection tool, the anchor bolt nuts being replaced with Supernuts to eliminate any movement of the crankcase after alignment.



New regout in green

A LIFETIME EXPERIENCE

Since 1977 we have been repairing foundations, installing new machinery, aligning, and regrouting all kinds of **Reciprocating** and **Rotating Machinery**.

Noise and vibration indicate issues that can affect a machine's reliability, such as imbalanced parts, and can even cause machines to fail through their own damaging effects.

As the only epoxy grout manufacturer with its own engineering and contracting arm, **Alphatec Engineering** is uniquely placed to give you the best combination of products and services, together with our commitment to quality reflected with our ISO 9001 certification.

GROUTING SPECIALISTS

In **Alphatec Engineering** we have different procedure of repairing critical machinery foundations, and the best technique of application of our polymer products.

Our main products are epoxy resin based grouts with inert fillers for stiffness and heat resistance, which we use to repair cracked or damaged foundations and to install new machinery following the **OEM** and **API RP 686** recommendations.



"We offer both products and services to the industries we serve, but primarily, we offer solutions to problems"

- Giles Goldsbro, Founder & Managing Director

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