

Introduction

The pulp & paper plant discussed in this case study processes millions of pounds of paper. The concrete flooring slabs and support structures in the plant are exposed to a tremendous amount of impact and live loads due to transportation of material and vibration. As the concrete structures breaks down, cracks are exposed to various chemicals used in the manufacturing process, which corrode and deteriorate the reinforcing steel rebar.

Problem:

The overhead slab repaired in this cased study was initially damaged from the topside by impact of 5,000 lb rolls of paper that were dropped on its surface. The impact resulted in cracking of the concrete, which propagated under continued loading and vibration. The damage was accelerated by high heat and extreme humidity which created moisture that corroded the steel rebar within the slab. The alternative repair method considered involved the use of steel plates that would be bonded to the underside of the slab with epoxy and anchor bolted. Due to access constraints, obstructions, and cost, the HJ3 carbon system was used in place of the steel plates.



Installation:

The surface of the slab was first prepared using a high-pressure water blast to eliminate loose particles and clean out the pours of the concrete. Next, the surface was primed with the HJ3 PC-100 Primer Coat to improve surface adhesion. Then, the HJ3 TC-300 Tack Coat was used to fill voids in the concrete and to hold the reinforcing material in place while the HJ3 SR-400 saturating was used to wet the HJ3 Carbon Fiber. In 24 hours the system was cured and ready for loading.



Conclusion

The damaged slab was repaired and strengthened with the HJ3 Carbon Composite System. The total installation was completed in one day and resulted in tremendous cost savings for the client. The main advantages of the HJ3 Carbon Composite System include:

- 10 x Tensile Strength of Steel
- Eliminated need to remove obstructions and overcome Access Constraints during installation
- Installed in the presence of moisture
- One day installation
- 50% Cost Savings over alternative 10 Gauge Steel Repair

