Case Study

ACUREN ENGINEERS DESIGN A SOLUTION FOR A TANK REFURBISHMENT PROJECT THAT SAVES OVER $100,000

A HIGHER LEVEL OF RELIABILITY®

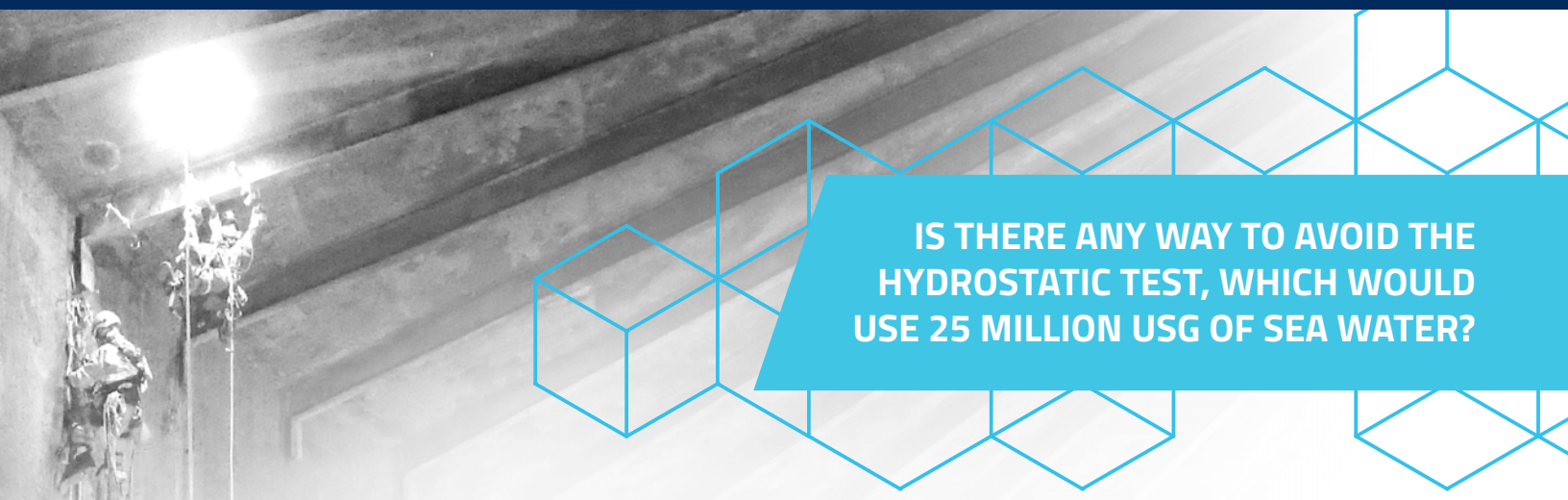
SUMMARY

This large refining customer is a crude oil refinery located in North America. Acuren has been the primary NDT, inspection and materials engineering service provider to them since 2010, including acting in a key role as technical and quality control support for a recent $100M tank farm upgrade. Acuren's ability to offer API 653 Inspectors and NDT technicians backed by our materials engineers enabled them to eliminate considerable time and cost from a recent tank refurbishment project.

THE CHALLENGE

For decades it has been a requirement that after any major tank repair a hydrostatic test would be performed. Hydrostatic testing of tanks helps prevent catastrophic failure due to brittle fracture and/or the presence of inherent flaws not detected by testing and inspection.

For any refiner, product storage is a critically managed task. When it comes to crude storage, it can directly impact productivity. When our large refining customer was faced with the requirement to upgrade one of their major crude storage tanks (260 foot diameter x 64 foot high) they turned to Acuren's expertise to eliminate unneeded hydrostatic test activities by seeking an exemption through the application of Fitness For Service (FFS) Methodologies as permitted by API 653. The hydrostatic test would have involved pumping in and then emptying approximately 25 Million USG of sea water. The customer was estimating at least a one month schedule requirement to complete the hydrostatic test.



IS THERE ANY WAY TO AVOID THE HYDROSTATIC TEST, WHICH WOULD USE 25 MILLION USG OF SEA WATER?

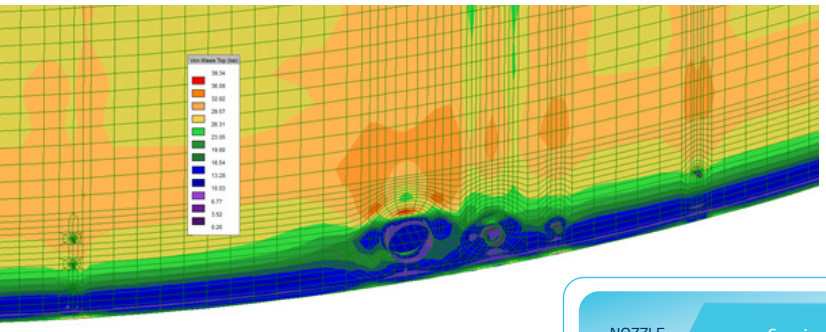
Completing a hydrotest using existing plant infrastructure would have taken upwards of a month. The FFS evaluation and hydrotest exemption that we were able to obtain enabled us to reduce the duration that the tank was out of service by the same amount of time. Acuren worked with us from the design stage through construction to the final turnover to make sure we were able to make the most of this opportunity. The early return to service was huge win for us. ~ *Project Manager*

ACUREN ENGINEERS SAVE OVER $100,000 AND 30 DAYS

CASE STUDY

THE METHODOLOGY

API 653 permits the use of FFS methodologies to exempt a tank that has undergone a major repair from the requirement for hydrostatic testing. API 579 FFS outlines, in great detail, the FFS process and engineering assessment required. Acuren's engineers used finite element modelling combined with the fracture toughness methodologies of API 579 to evaluate the tank materials for brittle fracture and critical flaw size. These outcomes were then compared against the operating condition and design criteria to ensure they fell within the acceptable operating envelope. Site API Inspectors and NDT Technicians were used to complement the FFS findings by ensuring the integrity of any repairs. Acuren's deep tank experience combined with our site presence allowed us to tailor a practical solution that removed considerable time and cost from our large refining customer's tank refurbishment project.



THE VALUE

The use of Fitness For Service Methodologies combined with Acuren's advance engineering capability allowed our customer to:

- **Remove 30 days of schedule and over $100,000 of cost from their tank refurbishment project.**
- **Eliminate the need to pump potentially harmful seawater and associated biologicals into their tank.**
- **Eliminate any associated risk with offloading potentially contaminated water back into the environment.**

NOZZLE	Service	NPS, in	Von Mises Maximum Stresses F_{max}, Ksi	Minimum Specified Yield Strength F_y, Ksi	Factor of Safety (FOS)
N1	Mixer A-5102/Manway	24.00	31.1	50	1.61
N2	Hot Oil Nozzle	4.00	28.3	50	1.77
N4	Crude from PSV to TK 101	2.00	30.0	50	1.67
N5	Water Draw	6.00	20.0	50	2.50
N6	Suction	16.0	22.8	50	2.19
N7	Inlet	36.00	41.5	50	1.20
N8	Low Level Alarm	2.00	30.0	50	1.67
N9	Hot Oil Nozzle	2.00	21.3	50	2.35
N10	Hot Oil Nozzle	2.00	27.1	50	1.85
N11	Hot Oil Nozzle	2.00	32.9	50	1.52
N12	Manway	24.00	35.7	50	1.40
N13	Hot Oil Nozzle	2.00	18.5	50	2.70
N14	Hot Oil Nozzle	2.00	30.0	50	1.67
N15	Hot Oil Nozzle	2.00	35.7	50	1.40
N16	Mixer A-5101/Manway	24.00	35.7	50	1.40
N17	Hot Oil Nozzle	2.00	21.3	50	2.35
N18	Hot Oil Nozzle	2.00	30.0	50	1.67
N19	Hot Oil Nozzle	2.00	35.7	50	1.40
N20	New 4" Φ Hot Tap Nozzle	4.00	21.3	50	2.35
N21	New 10" Φ Hot Tap Nozzle	10.00	30.0	50	1.67
N22	New 10" Φ Hot Tap Nozzle	27.1	30.1	50	1.66

ACUREN

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BEYOND INSPECTION