



CASE STUDY

INDUSTRY: REFINERIES



CUSTOMER: Shell

LOCATION: Stanlow, United Kingdom



BACKGROUND: Shell Chemicals at Stanlow manufactures a range of petrochemicals from raw materials. Water hammer in the superheated low pressure steam distribution pipe tracks had led to leaks and complete loss of a steam manifold. The water hammer was severe and seemed to occur at random without apparent reason.

SCOPE OF WORK: To find the root cause, Armstrong International performed an extensive water hammer audit. For the audit, Armstrong built special measuring equipment cabinets to meet the site's specific safety requirements. The measurements included PT100 temperature sensors, pressure sensors, Armstrong Water Hammer Detectors, and Armstrong QM-1 steam dryness measuring manifolds.

Analysis of the observed measurements revealed that water hammer occurred in the rare occasion of simultaneously shutting down one unit while starting up another unit. Part of the steam flow was split over two parallel running steam lines, in this case some low points were fully blocked by accumulated condensate. Increasing velocities and reversing flow directions moved all condensate towards elevated expansion loops and an elevated road crossing where the water hammer occurred. Armstrong recommended installing additional 25 line drains on all critical low points identified.

BENEFITS: The new steam lines were critical in improving the safety and reliability of the plant's steam system by reducing the potential risk of future water hammer incidents