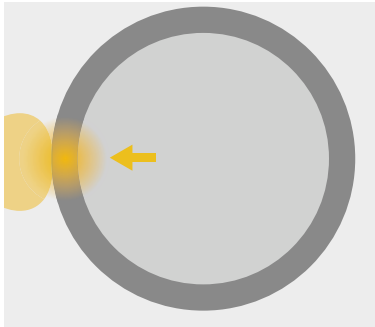


MILLENNIUM

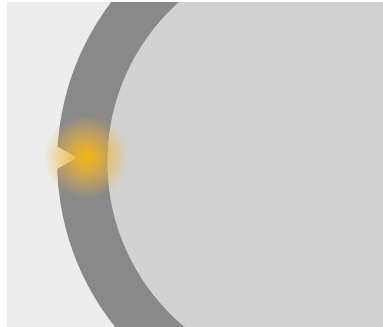
PIPELINE DESIGN

CAUSES OF STRESS CONCENTRATION IN THE PIPE WALL

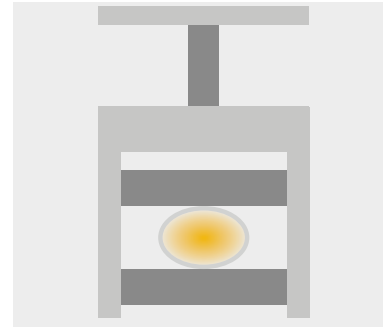
Excluding third-party damage, brittle failure through slow crack growth (SCG) is the most commonly detected failure mode in PE pressure pipes. The initiation of SCG arises from stress concentration in the pipe wall brought on by damage resulting from harsh installation conditions or squeeze-off stopping practices, which can initiate a stress crack and ultimately lead to premature failure.



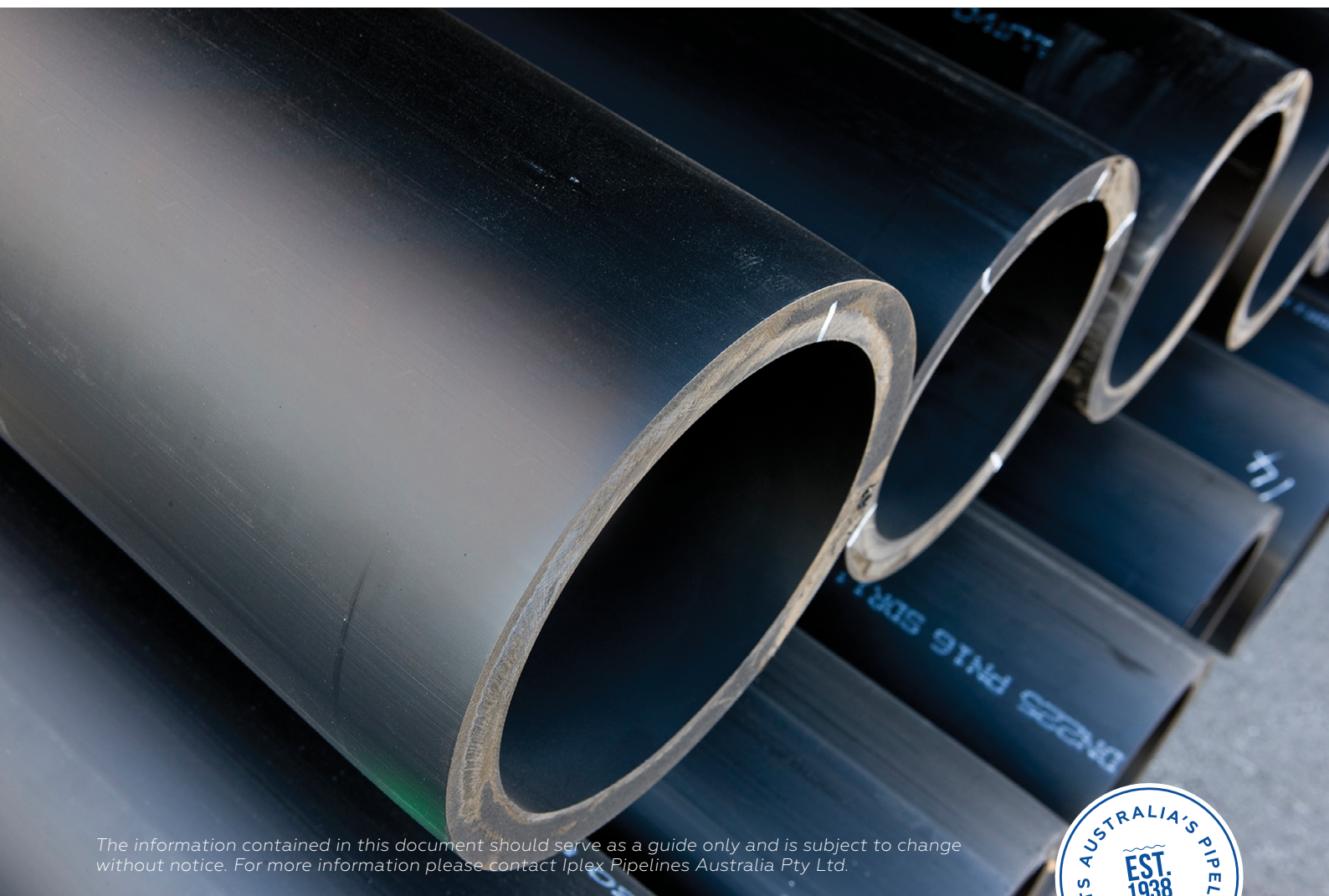
A POINT LOAD



A SCRATCH OR NOTCH IN THE PIPE SURFACE



AGGRESSIVE TREATMENT DURING SQUEEZE-OFF



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PIPELINE DESIGN

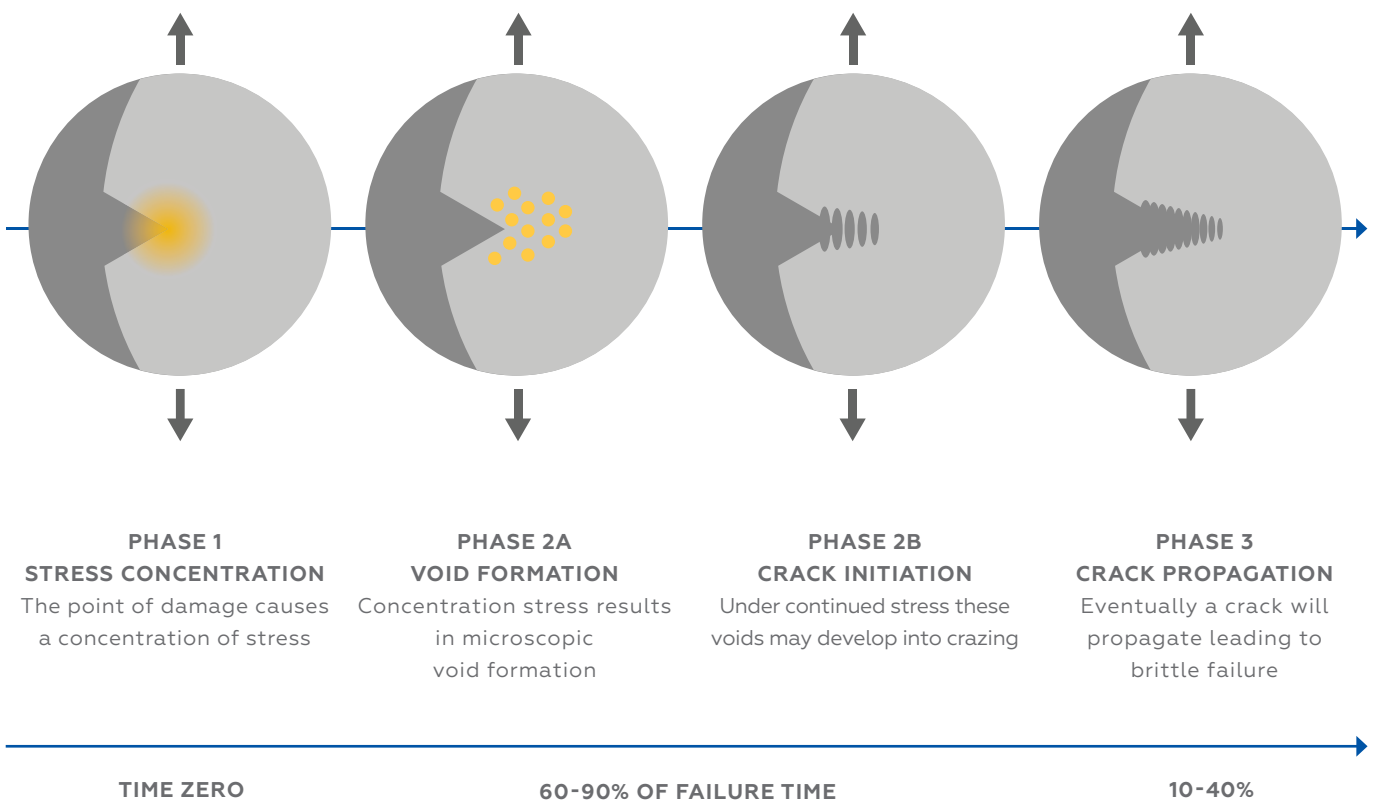
HOW DOES SLOW CRACK GROWTH PROGRESS?

There are three phases in slow crack growth development.

Phase one is the creation of a stress concentrator, the point of damage causing a concentration stress.

Crack initiation is the second phase. Under sustained stress microscopic voids may form, which develop into fibrillar crazing leading to crack initiation.

Phase three, crack propagation will lead to brittle fracture and result in the pipe bursting.



Up to 90% of the time to ultimate failure is occupied by Phase 2 void formation and crack initiation.

The most effective way of minimising risk of failure therefore, is to enhance resistance to crack initiation. This is a far more effective solution to the conventional approach that relied on increasing wall thickness as a means of reducing risk of brittle failure.

Iplex Millennium® is up to ten times more resistant to Phase 2 crack initiation than conventional PE100 pipe.

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