Concrete Pipe Association of Australasia

CPAA – Focusing on what matters

JULY 2023

A bit about the CPAA

Concrete Pipe Association of Australasia

- Represents its members on matters relating to pipes and related products
- A focus on appropriate, durable and sustainable specification
- Members manufacture and supply to the requirements of AS/NZS standards
- participate in AS/NZS standard development
- performance based standards that provide long term value to asset owners




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Pipelines are important structures:

Structural performance and in-service life depend on achieving the specified design and installation requirements appropriate to:

- the selected pipe material
- the available site conditions
- Resilience to natural and unnatural threats

THREATS to Drainage Infrastructure

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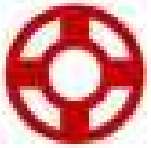
Natural



- Flooding

- Extreme Temperatures

- Severe Rain

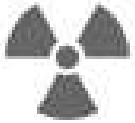
- Storms

- Bushfires

Unnatural

- Vehicle Accidents

- Poor Installation



- Chemical/Oil Spills

- Vandalism

• Sustainable and Resilient

- Tightly specified input materials
- Understanding of material commonplace
- Made to be consistently reproduced
- Have a design life of 100 years
- Proven history of 100+ years
- Does not burn
- Factory built strength
- Great buoyancy resistance due to weight
- Low coefficient of expansion
- Least imported materials for installation
- Includes waste products – known and understood
- Recycled steel

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RCPA EKOPIPE

UTILISING BX3

- ✔ EKOPIPE reduces the use of Portland Cement by an impressive 80%.
- ✔ EKOPIPE reduces concrete CO_2 emissions by more than 50%.

Precast concrete **you can trust.**

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At Humes, we are committed to transparency with our customers, which is why FutureCast is backed by Environmental Product Declarations (EPDs).

Humes precast concrete range backed by EPDs

Carbon offsetting

100% carbon neutral precast concrete

FutureCast
Precast concrete you can trust

FutureCast ZERO
Carbon neutral precast solutions

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The HyndsLC® range is available in a set of standard reductions:

- LC 25 - Our lower carbon concrete and raw materials option to provide an average manufactured product carbon reduction of 25%
- LC 40 - Our lowest carbon concrete and raw materials options, with optimized design and process improvements, to provide an average manufactured product carbon reduction of 40%*
- LC 100 - Our lowest available carbon products combined with certified carbon credits to provide a carbon reduction of 100% (net zero)

Support Types and contribution of soil

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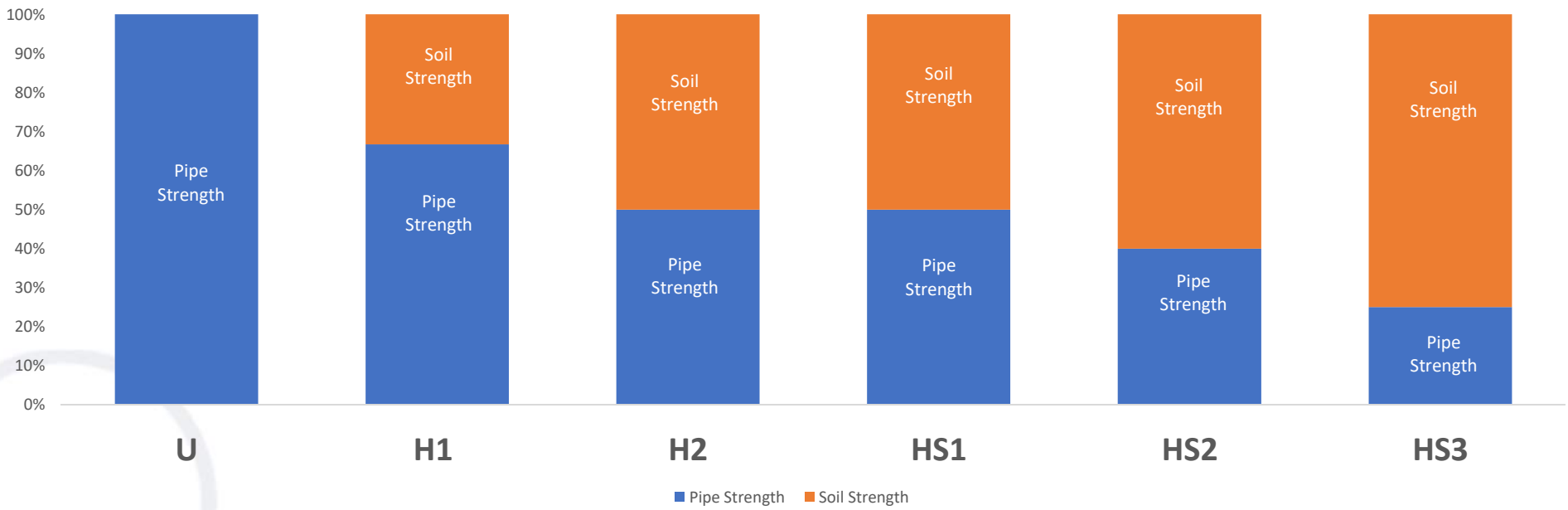

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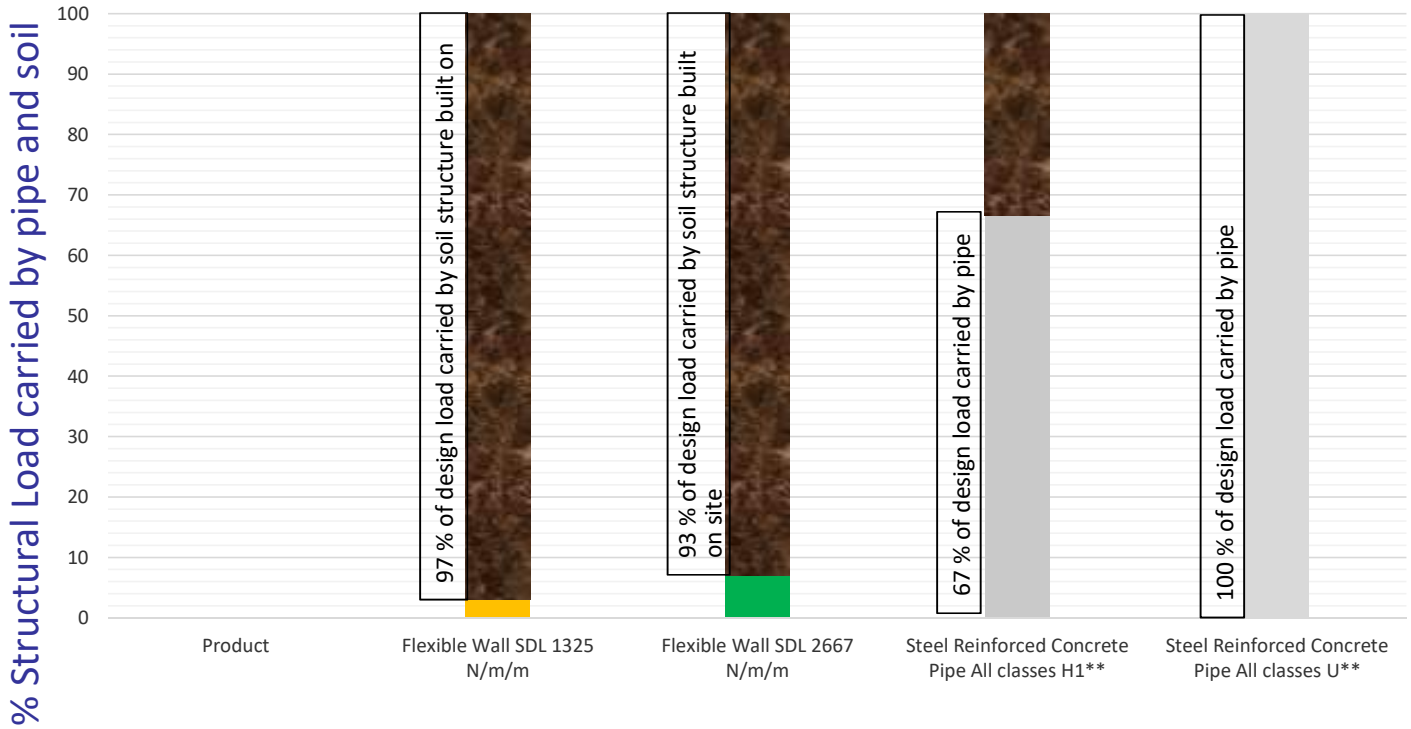
% Pipe Structural Capacity Built on Site



*Values derived from denominator of Eqn 5.2(2) AS/NZS 2566: 1998 using E" =5MPa and Long Term Stiffness Values (SDL) taken from published data relative to flexible wall products.

** value derived from Eqn 10.2 (a) AS/NZS 3725: 2007 for H1 installation

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Thinking sustainability – use minimum valuable resource

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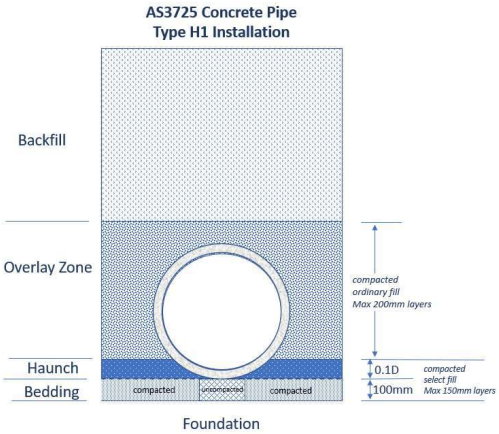

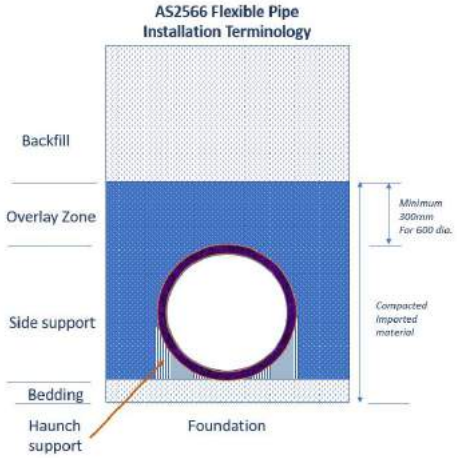

Less imported material → More imported material

FLEXIBLE imported material				RIGID H1 imported material		
Dia	Embedment material volume/m of pipe	bulked		Bedding and haunch volume/m of pipe	bulked	**% more for flexible**
	m3/m	m3/m		m3/m	m3/m	
225	0.23	0.28		0.07	0.09	**318%**
300	0.29	0.35		0.09	0.10	**337%**
375	0.42	0.50		0.10	0.12	**422%**
450	0.49	0.59		0.12	0.14	**409%**
525	0.80	0.96		0.14	0.17	**569%**
600	0.89	1.07		0.16	0.19	**562%**

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Potential savings of $178 **per lineal metre***

*Figure is the difference between AS/NZS 2566 embedment configuration for flexible plastic pipe and H2 support for Concrete Rigid Pipe. Costs based on DN600 pipe. Potential cost savings are based on normal ground conditions and cost for granular bedding being $85 per cubic meter** and cost of material being taken off site to landfill, being $55 per cubic meter**. (figure shown is independent of pipe costs).
**values sourced from Rawlinsons The Hand Book Edition 40

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DURABILITY STUDY - UTS

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Proving:

- High degree of compaction, high cement content, low water cement ratio slow the propagation of cracks.
- Small cracks don’t affect life even in chloride environment.
- Current cover to steel requirements adequate

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TIME FOR QUESTIONS

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Housekeeping

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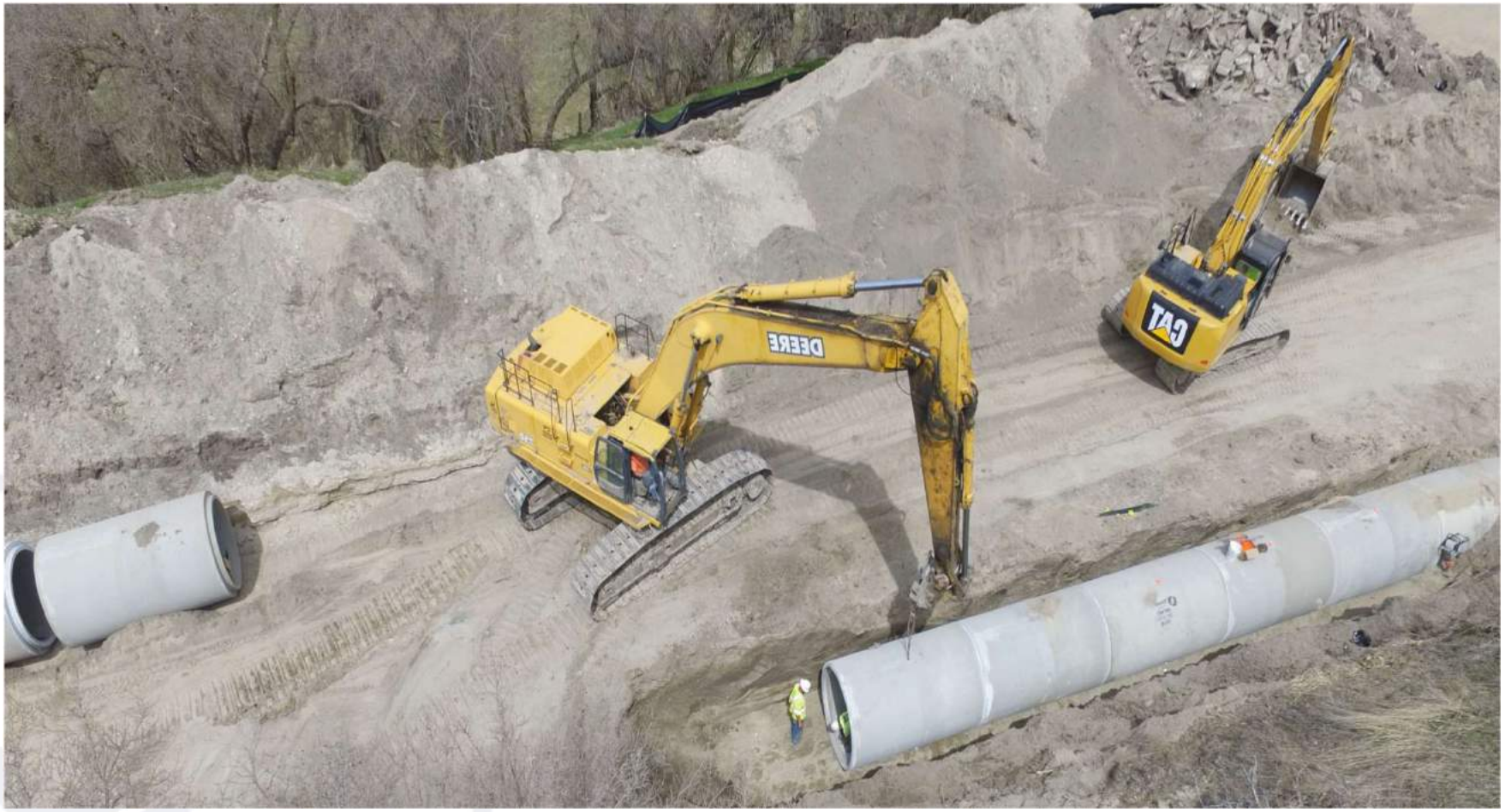

Crack less than 0.15mm – various views

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Compaction under haunch important

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Bridging:

When backfill is "dumped" into a trench on either side of a pipe, the angle of repose of the backfill material often exceeds the radius of the pipe wall and begins to "bridge" or accumulate at the pipe haunches – leaving a void between soil and pipe wall.

Soil support and embedment needs differ

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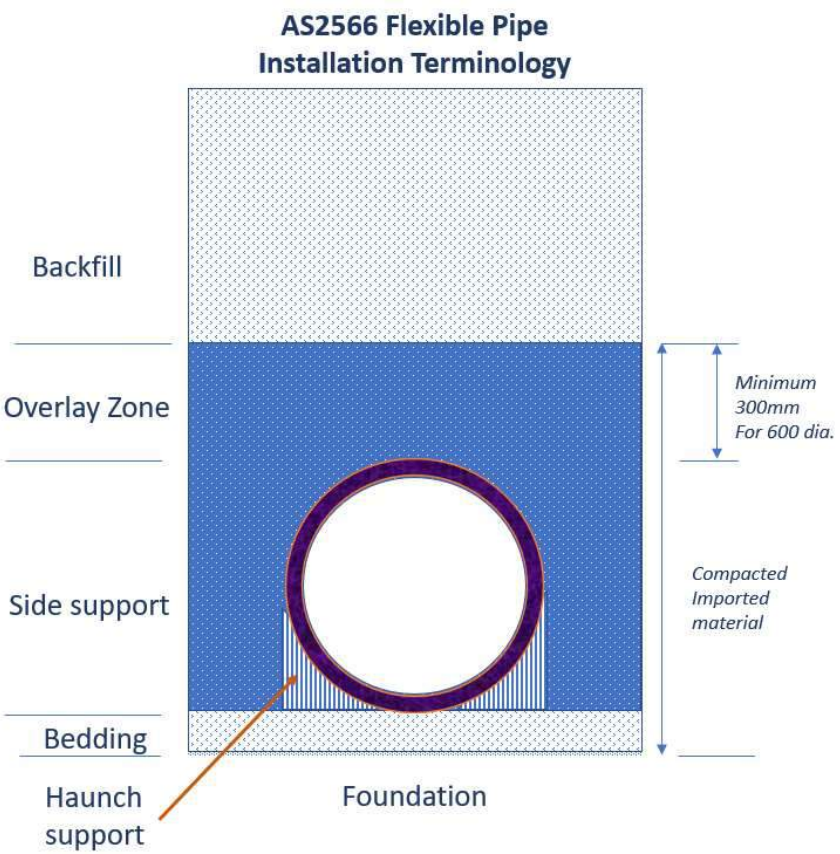

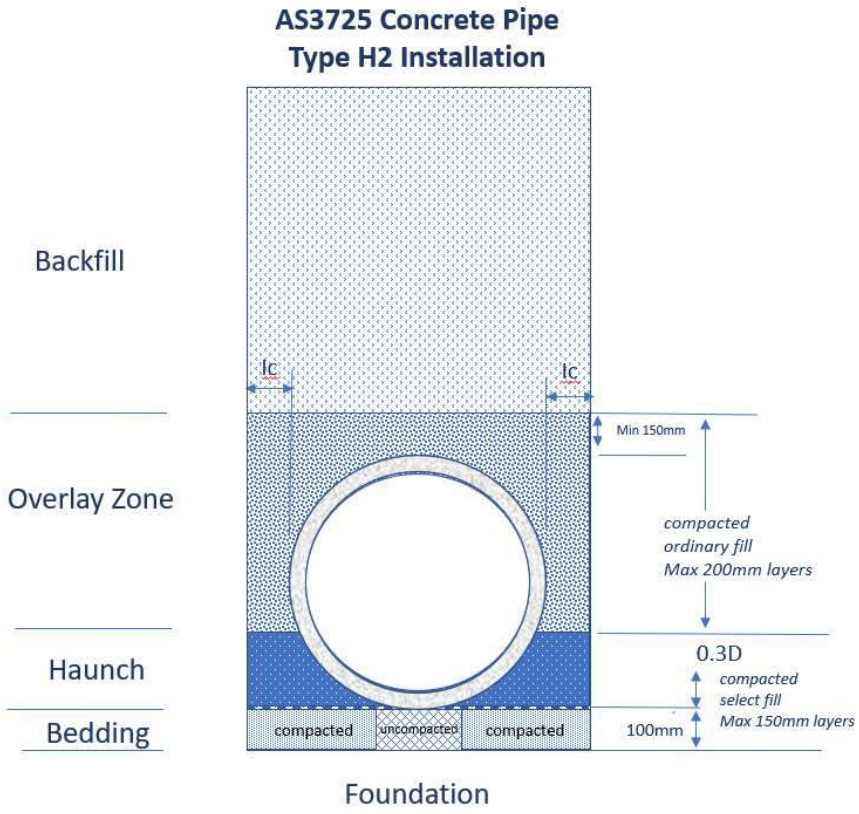

Design & Installation conversation

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- Elimination of unwanted cracks
- Resilience – pipe structures under road critical consideration

Pipe Design

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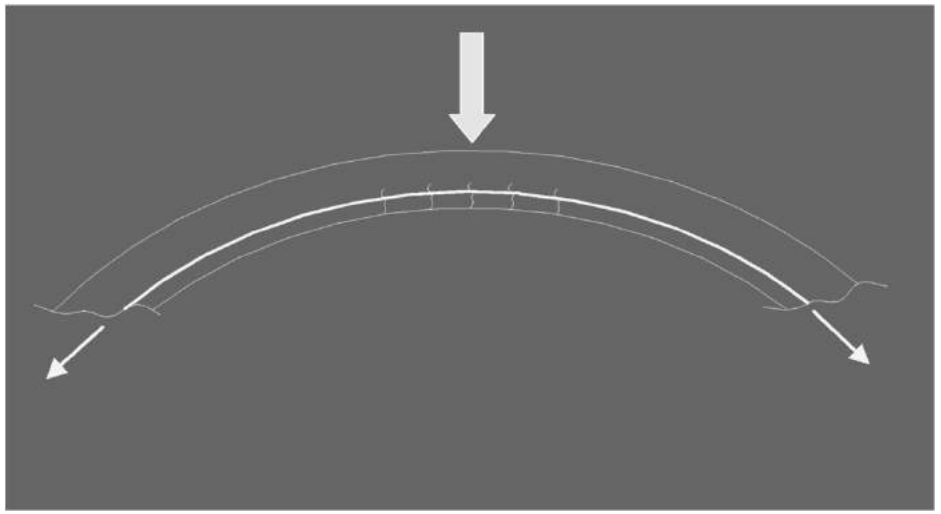
- Longitudinal cracks develop during load testing when the pipes are proof load tested to a maximum 0.15 mm crack width - as is required in AS/NZS4058.
- In the field, longitudinal cracks will also develop when pipe loads get close to, or exceed pipe class strength.



Who am I?

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Karen Thompson - Executive Director CPAA

- Civil Engineer
- Management, research, design, manufacture and application experience in steel reinforced concrete pipe, fibre reinforced pipe, vitrified clay pipe, corrugated metal pipe and plastic pipe.
- Experienced in development, design, manufacture and application of precast concrete structures including bridges, Stormwater quality structures, headwalls, pits, sewer access systems.
- Participate in Standards Australia committees
  - concrete pipe,
  - flexible pipe
  - access covers.
  - Current Chair of WS006 – Precast Concrete Pipes

Installation Support Types

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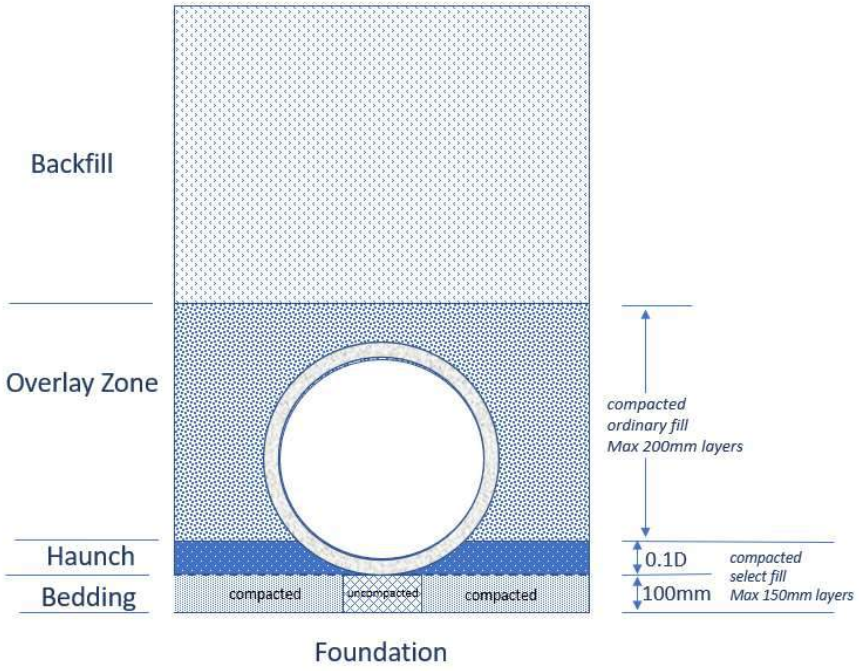
AS3725 Concrete Pipe
Type H1 Installation



AS3725 Concrete Pipe
Type H2 Installation

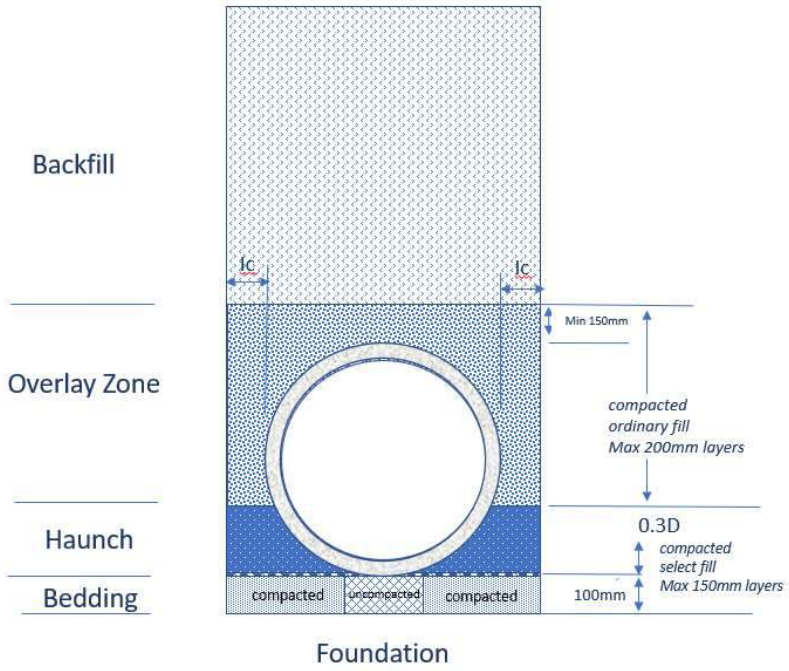


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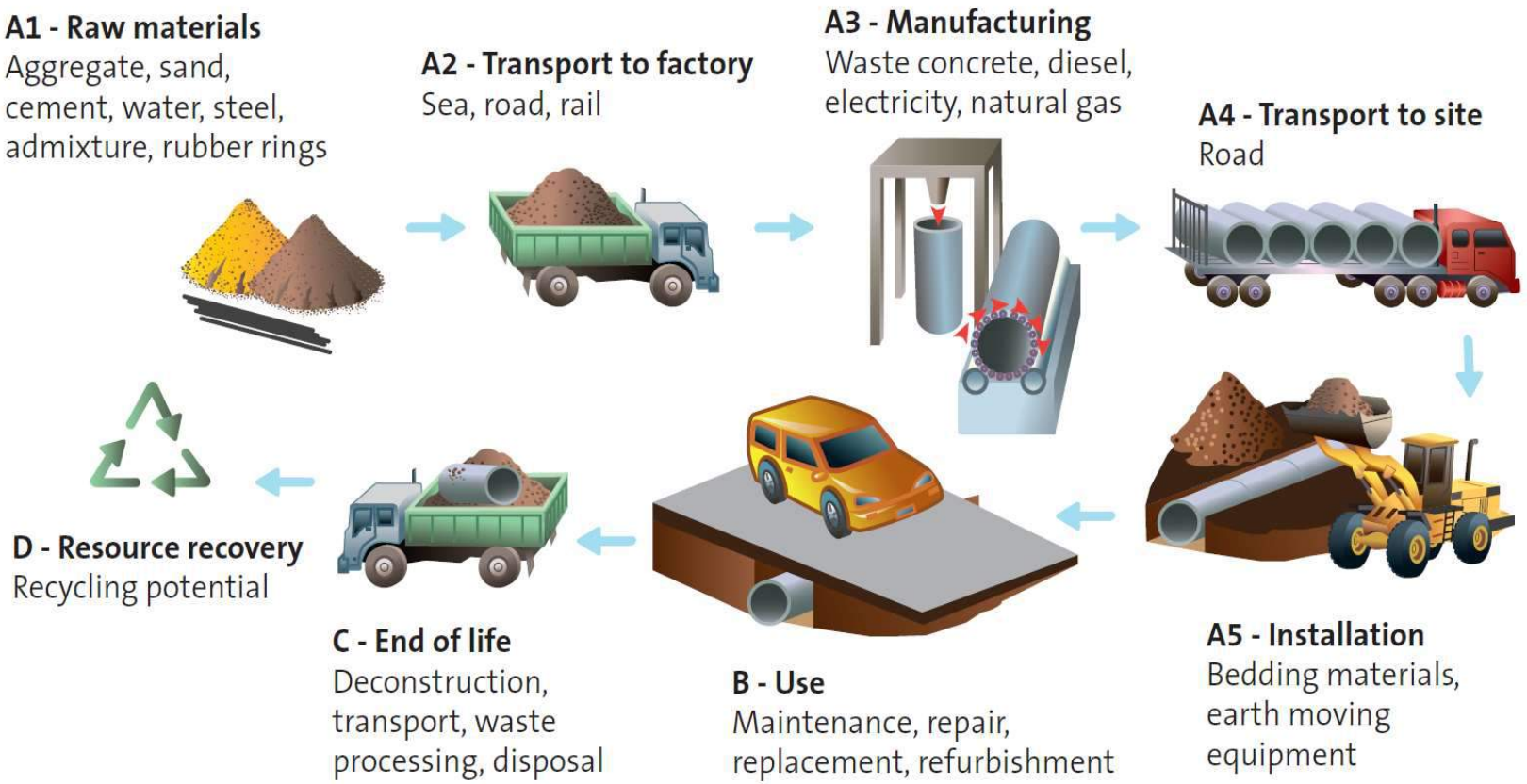
Figure 3 – Product lifecycle of steel reinforced concrete pipes



Bedding Factor Increased

BF=2.0

BF=2.5

BF=4.0

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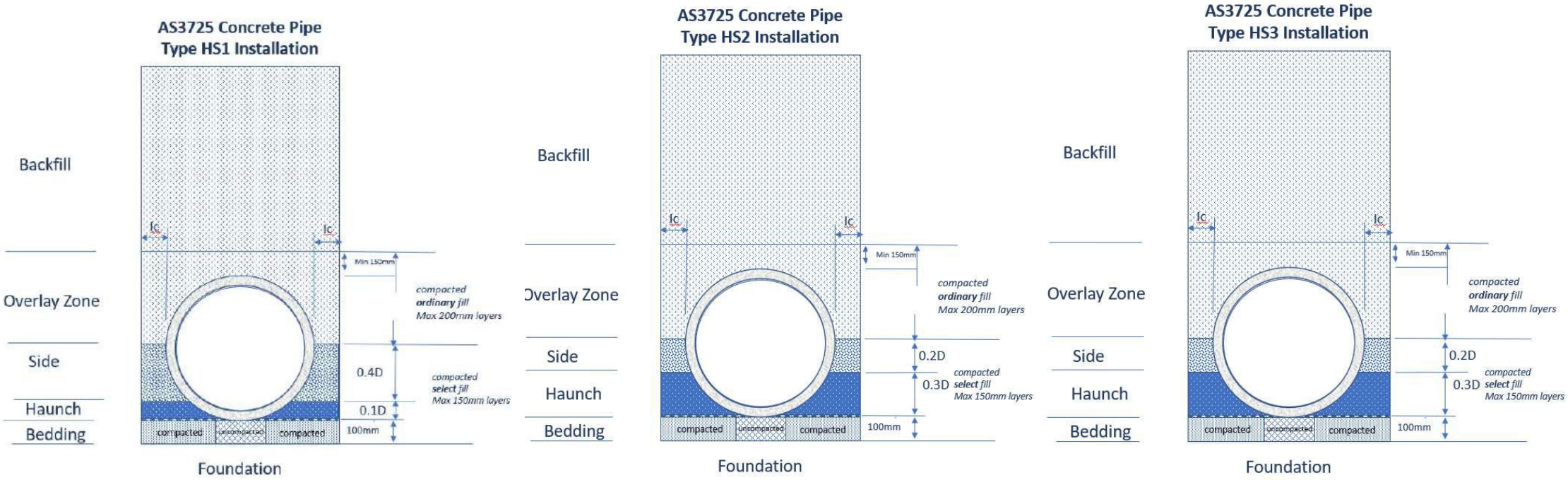

Compaction Increased

Id = 50%

Id = 60%

Id = 70%

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NEWS