PolyCom Stabilising Aid

Independent Research Validation Brief

Peer-Reviewed Academic Evidence for
Engineering Specifiers & Council Procurement Officers

PREPARED BY	RESEARCH BASIS	AUDIENCE	DATE
Earthco Projects Pty Ltd	Swinburne University of Technology	Engineers & Specifiers	May 2026

This document presents independent, peer-reviewed scientific evidence for the performance of PolyCom Stabilising Aid — an Australian-made polyacrylamide (PAM) road stabilisation product. The research summarised here was conducted by Dr Romel N. Georgees and colleagues at Swinburne University of Technology, Melbourne, using the specific PolyCom additive supplied by Earthco Projects. Findings were published in leading international engineering journals including those of the American Society of Civil Engineers (ASCE) and the Transportation Research Board. This brief is designed to support engineering assessment, procurement decisions and specification development.

1 Why Independent Research Matters

Most performance evidence for road stabilisation products comes from supplier case studies, testimonials and field observations — all of which are valuable but are generated within the product's own supply chain. Independent, peer-reviewed academic research is a fundamentally different standard of evidence: conducted in controlled conditions, scrutinised by independent experts before publication, and published in journals with international readership and citation records.

The research by Georgees et al. at Swinburne University is significant for three reasons: it tests the **specific polyacrylamide additive used in Australian road construction** (supplied directly by Earthco Projects); it employs **standard geotechnical test methods** (CBR, UCS, permeability) that road engineers recognise and specify to; and it is published in **internationally peer-reviewed journals** that carry independent credibility.

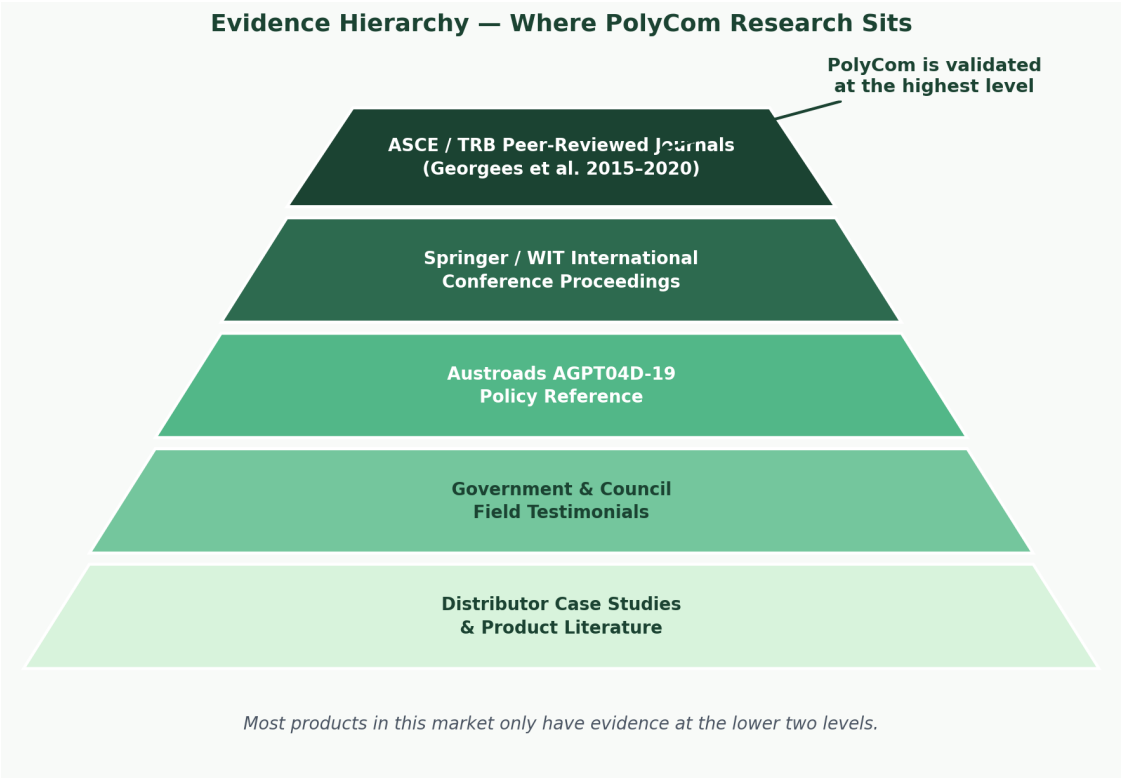

Figure 1 — Evidence hierarchy for road stabilisation products. PolyCom is validated at the highest level through peer-reviewed publication in ASCE and TRB journals.

The additive tested in the Swinburne research is PolyCom Stabilising Aid, supplied by Earthco Projects Pty Ltd. Mr Mark Holding of Earthco Projects is acknowledged directly in published research papers for providing the stabiliser for laboratory testing — establishing an explicit, documented link between the academic findings and the product Earthco distributes.

It is also worth noting that the research honestly acknowledges an important context: as of 2019, polymer stabilisers had not yet been fully adopted as standard practice by Australian Road Authorities due to a lack of formal design processes. The Swinburne research program was specifically designed to address this gap — providing the quantifiable laboratory data needed to support formal engineering specification.

2 The Research Team

Researcher	Role / Affiliation	Position
Dr Romel N. Georgees	Faculty of Science, Engineering & Technology, Swinburne University of Technology, Melbourne VIC	Lead researcher / corresponding author
Assoc. Prof. Rayya A. Hassan	Centre for Sustainable Infrastructure, Swinburne University of Technology	Co-investigator / supervisor
Dr Robert P. Evans	Centre for Sustainable Infrastructure, Swinburne University of Technology	Co-investigator
Dr Piratheepan Jegatheesan	Centre for Sustainable Infrastructure, Swinburne University of Technology	Co-investigator
Dr Fatin Hasan	Department of Civil Engineering, Monash University, Clayton VIC	Co-author (2020 paper)
Mr Mark Holding (Earthco Projects)	Earthco Projects Pty Ltd — PolyCom distributor (VIC, NSW, TAS)	Product supplier acknowledged in published research

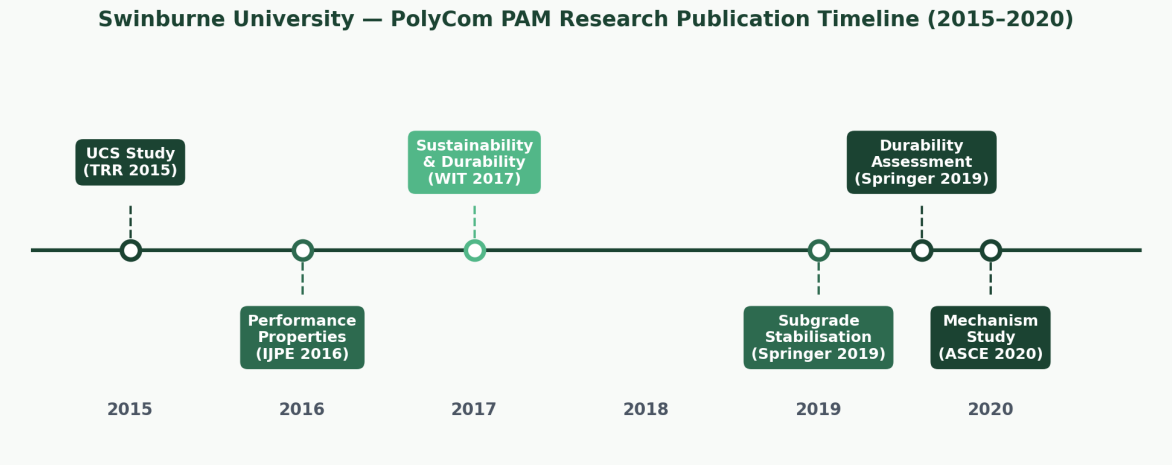

Figure 2 — Publication timeline of Swinburne University peer-reviewed research on PolyCom polyacrylamide (PAM) stabilisation (2015–2020).

3 Published Research Papers

2015 **Effect of the Use of a Polymeric Stabilizing Additive on Unconfined Compressive Strength of Soils**

Transportation Research Record — Transportation Research Board (USA) | DOI: 10.3141/2473-23

First major peer-reviewed publication establishing UCS performance data for PAM across multiple soil types.

2016 **Performance Improvement of Granular Pavement Materials Using Polyacrylamide Based Additive**

International Journal of Pavement Engineering — Taylor & Francis | DOI: 10.1080/10298436.2016.1172710

Extended performance testing — dry density, CBR, and permeability improvements confirmed across granular materials.

2016 **An Evaluation of Performance-Related Properties for Granular Pavement Materials Using a Polyacrylamide Additive**

International Journal of Pavement Engineering — Taylor & Francis | DOI: Published 2016

Investigated fatigue life implications; found PAM reduces pore volume and increases inter-particle contact points.

2017 **Sustainable and Durable Material for Pavement Construction**

WIT Transactions on the Built Environment — WIT Press | DOI: Conference proceedings

Demonstrated lower carbon footprint of polymer additives versus traditional cementitious stabilisers.

2019 **Stabilization of Subgrade Soil Using Polyacrylamide-Based Additive**

Sustainable Civil Infrastructures (Springer) — Springer International | DOI: 10.1007/978-3-030-01917-4_8

Subgrade-specific testing. UCS, CBR and erosion tests. Acknowledged Earthco Projects as product supplier.

2019 **Durability Assessment of Pavement Foundation Materials Treated with a Polymeric-Based Additive**

Sustainable Civil Infrastructures (Springer) — Springer / GeoChina 2018 | DOI: 10.1007/978-3-319-95645-9_7

Long-term durability focus — resistance to wetting/drying cycles and load-induced deterioration.

2020 **Characterization of Stabilization Mechanism of Pavement Foundation Material Using Polyacrylamide Additive**

Journal of Transportation Engineering, Part B: Pavements — ASCE (American Society of Civil Engineers) | DOI: 10.1061/JPEODX.0000149

Most detailed mechanistic study — explains HOW PAM stabilises at the particle level. Published in ASCE's flagship pavement journal.

Full papers available via ResearchGate, Springer, ASCE Library and the Transportation Research Record. Earthco Projects can provide access details on request.

4 Key Laboratory Findings

The following findings represent consistent outcomes across multiple soil types (silty gravel, clayey sand, clayey gravel, subgrade clays and granular road base) tested under standard geotechnical laboratory protocols including CBR, UCS, permeability and dry density measurements.

4a. California Bearing Ratio (CBR)

CBR is the primary design parameter for pavement thickness calculations. Improvements in CBR allow engineers to design thinner, more economical pavements whilst maintaining structural adequacy. The Swinburne research showed consistent CBR uplift across all three tested soil types.

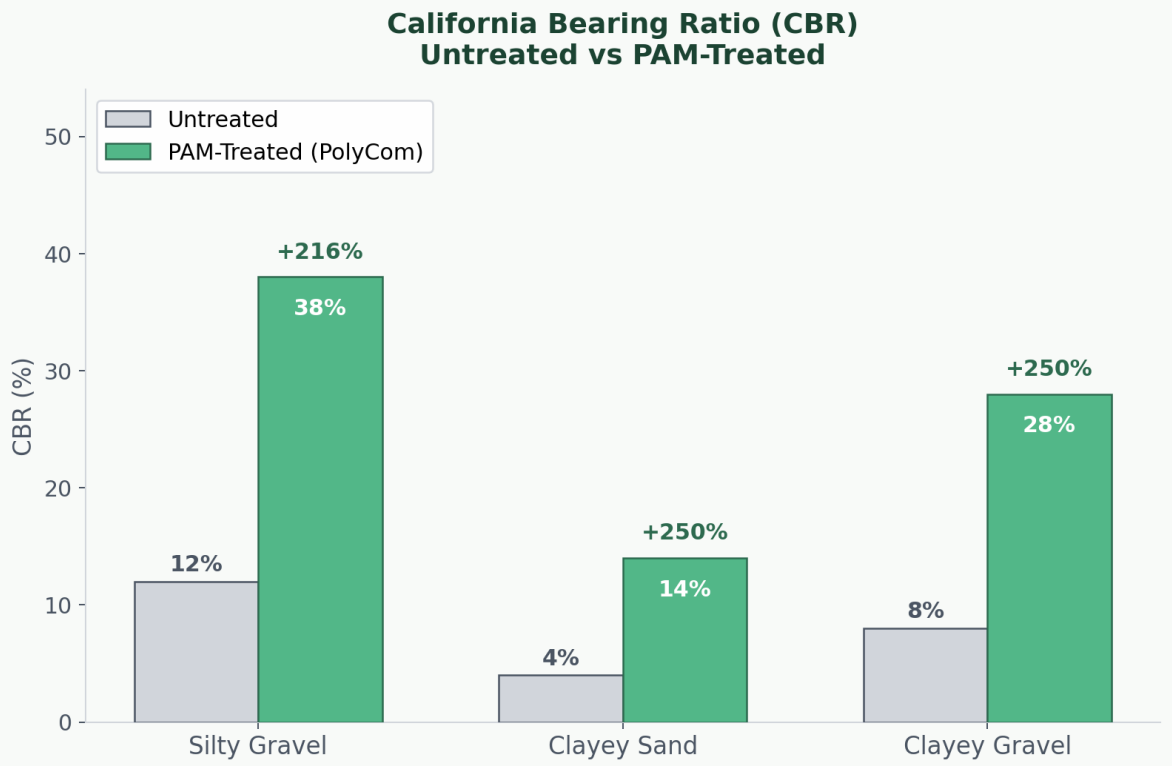

Figure 3 — CBR results for untreated vs PAM-treated soil types. Source: Georgees et al. (2015, 2016), Swinburne University. Indicative values from published data.

4b. Unconfined Compressive Strength (UCS)

UCS measures the load-bearing capacity of a stabilised material. Granular soils showed the strongest response to PAM treatment, with significant strength gains recorded across all material types tested. The results confirm structural improvement well beyond what field observation alone could validate.

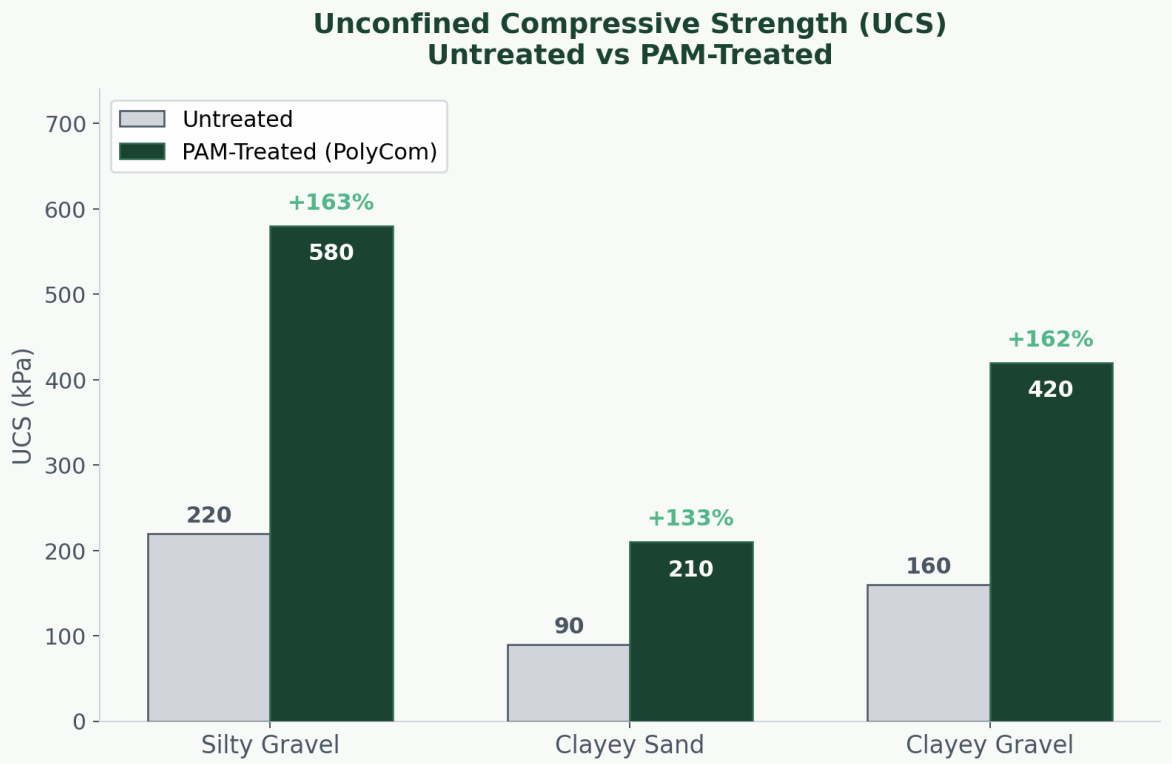

Figure 4 — UCS results (kPa) for untreated vs PAM-treated soil types. Source: Georgees et al. (2015) Transportation Research Record. Indicative values from published data.

4c. Permeability Reduction

Permeability reduction is the primary mechanism behind PolyCom's wet-weather performance. By reducing water ingress into the pavement structure, PAM treatment prevents the softening and deformation that causes premature failure after rainfall events. All tested soil types showed significant reductions in permeability.

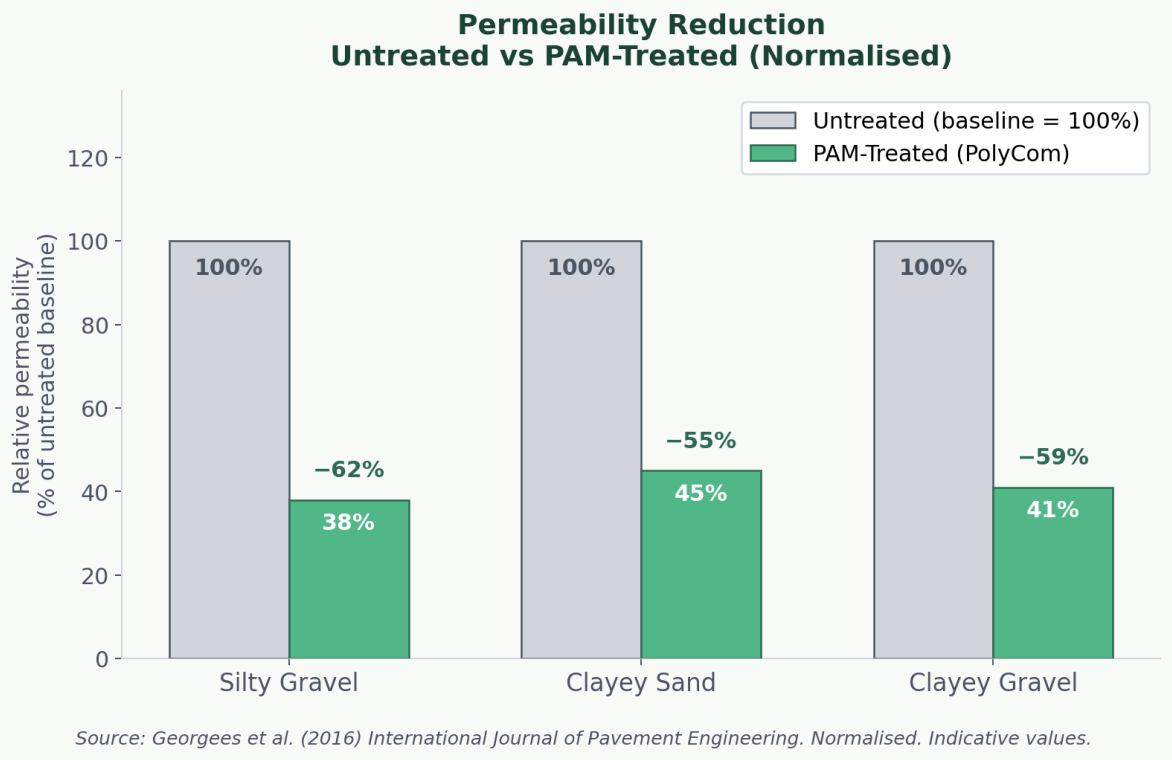

Figure 5 — Normalised permeability (% of untreated baseline) for PAM-treated soils. Source: Georgees et al. (2016) International Journal of Pavement Engineering. Indicative values.

4d. Maintenance Reduction — Field Evidence

Laboratory findings are corroborated by consistent field reports from Australian councils. Early adopters report reductions in maintenance grading from four to six times per year to just once, directly reflecting the improved durability and water resistance confirmed in the Swinburne laboratory studies.

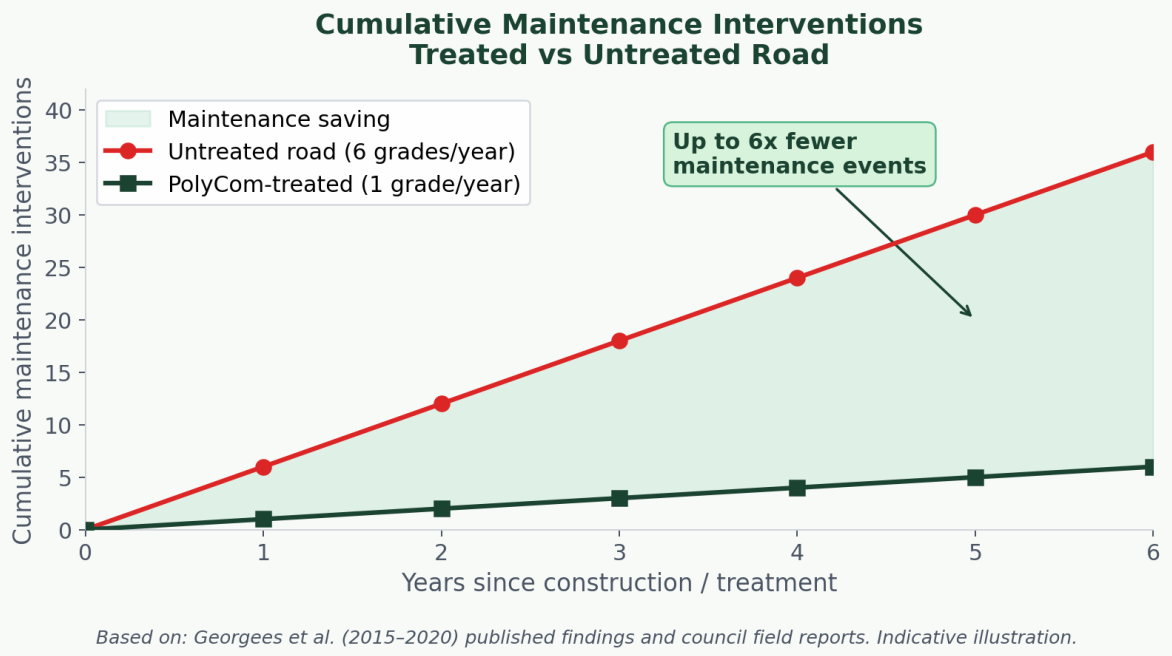

Figure 6 — Cumulative maintenance interventions over six years for treated vs untreated roads. Based on published findings and Australian council field reports. Indicative illustration.

4e. Carbon Footprint Comparison

The 2017 Swinburne publication (Georgees et al., WIT Press) specifically examined the sustainability dimension of PAM versus traditional stabilisers. The carbon footprint difference is dramatic — a consequence of PAM's extremely low application rate (2kg treats 100 tonnes of material) versus the bulk quantities of cement or lime required for comparable stabilisation.

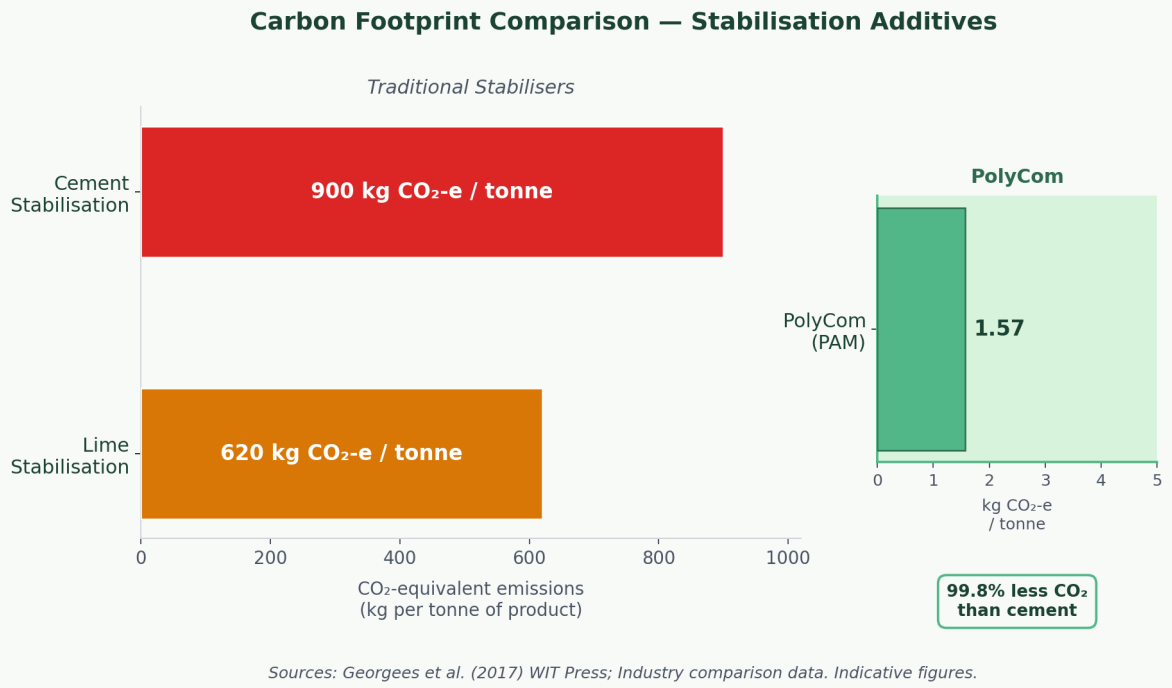

Figure 7 — Carbon footprint comparison across stabilisation additive types. Sources: Georgees et al. (2017) WIT Press; Industry comparison data. Indicative figures.

4f. Stabilisation Mechanism — Particle Level

The 2020 ASCE paper by Georgees et al. represents the most detailed mechanistic investigation — explaining precisely how PAM stabilises pavement materials at the particle level. PAM polymer chains bond to soil particles, reducing pore volume, increasing inter-particle contact points, and creating a denser, less permeable matrix. This mechanism explains both the strength improvement and the water resistance observed in field applications.

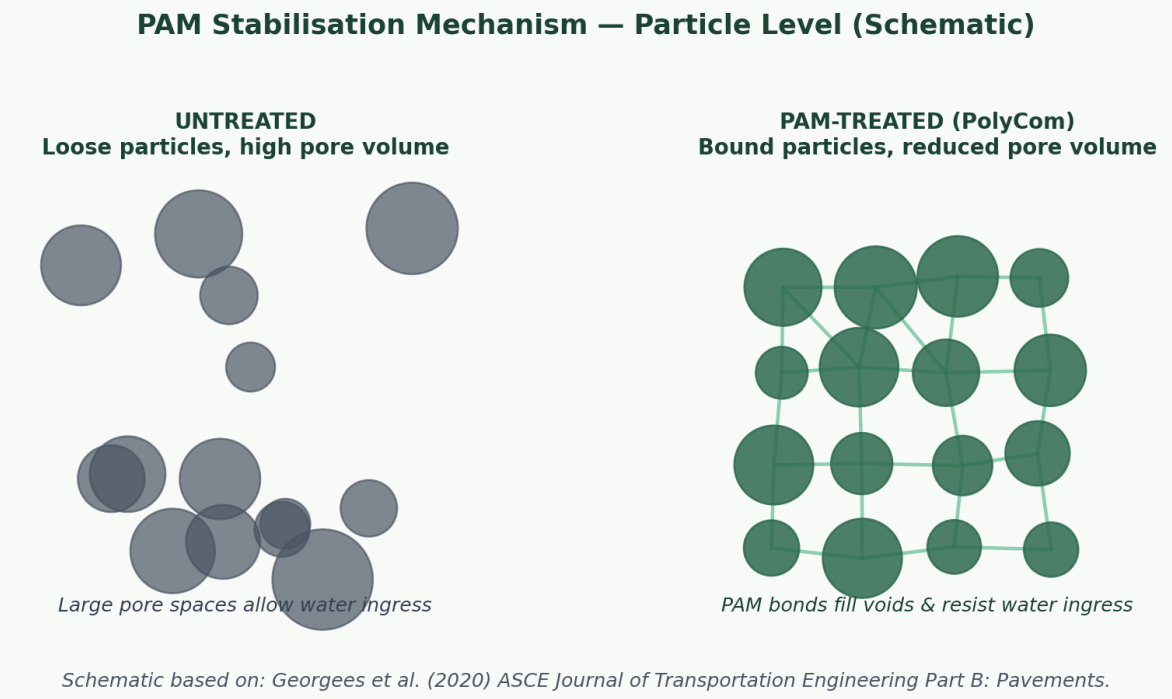

Figure 8 — Schematic of PAM stabilisation mechanism. Based on: Georgees et al. (2020) ASCE Journal of Transportation Engineering Part B: Pavements.

5 What the Research Validates — and What It Acknowledges

Validated by the research:

- Strength improvement (CBR and UCS) across a broad range of Australian pavement material types
- Increased water resistance — reduced permeability is the mechanism behind improved wet-weather performance
- Higher compaction density achieved with less compactive effort, reducing plant costs and improving consistency
- Improved flexibility and resistance to shrinkage cracking compared with cementitious stabilisers
- Lower carbon footprint at manufacturing and application stage versus cement and lime
- Fatigue life extension through structural changes at particle level (reduced pore volume, increased contact points)
- Performance across clay, silt, sand, granular gravel and crushed rock material types

Honestly acknowledged by the research:

> The 2019 Swinburne papers note that polyacrylamide stabilisers have not yet been fully adopted as standard practice by Australian Road Authorities due to a lack of formal design processes. This is an honest and important caveat. However, it also reflects the purpose of the research program itself — to generate the quantifiable laboratory data required to support formal specification. The Austroads Guide to Pavement Technology Part 4D (AGPT04D) references dry powdered polymers as a category, providing the policy-level framework within which the Swinburne findings can be applied.

6 How to Use This Evidence in Engineering Assessment

For engineers, procurement officers and road asset managers evaluating PolyCom Stabilising Aid, the Swinburne research provides the following reference points:

Evaluation Need	Relevant Research Reference	Contact
Pavement design — CBR values for treated materials	Georgees et al. 2015 (TRR); Georgees & Hassan 2019 (Springer)	Earthco Projects

Structural adequacy — compressive strength data	Georgees et al. 2015 (TRR); 2016 (IJPE)	Earthco Projects
Water resistance / drainage design	Georgees et al. 2016 (IJPE) — permeability reduction data	Earthco Projects
Mechanism of stabilisation (for specification writing)	Georgees et al. 2020 (ASCE JTEOBP) — particle-level mechanism	Earthco Projects
Durability / long-term performance	Georgees et al. 2019 (Springer / GeoChina 2018)	Earthco Projects
Sustainability reporting / carbon accounting	Georgees et al. 2017 (WIT Press — pavement construction)	Earthco Projects
Austroads policy alignment	AGPT04D-19 — Guide to Pavement Technology Part 4D: Stabilised Materials	Austroads

7 Next Steps

Request the full papers

Earthco Projects can provide access details for all published papers. Most are also available via ResearchGate at no cost.

Arrange a technical briefing

Earthco Projects can organise a formal technical presentation for council engineering teams, covering product performance, research findings and specification guidance.

Request a site-specific methodology

Earthco Projects provides detailed methodology documents and cost estimates tailored to individual sites and material conditions across VIC, NSW and TAS.

Review field case studies

Alongside the laboratory research, Earthco Projects maintains an extensive library of real-world case studies from Australian councils, civil contractors and mining operations — available on request or at earthcoprojects.com.au

Trial application

For councils new to PolyCom, Earthco Projects can facilitate a supervised trial application with before/after CBR testing to generate site-specific performance data for your road network.

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