



Keynote Panel #1

Malek Bouazza, Boyd Ramsey, Mike Sadler

GEOANZ #1

ADVANCES IN GEOSYNTHETICS
7-9 JUNE 2022 | BRISBANE CONVENTION & EXHIBITION CENTRE

Presentations, Sessions 1 and 2

Understanding dipole method testing results-1

The relationship between confining pressure and geomembrane strain-1

A story of elevated leakage, whales and the forensics journey-1

Global ageing behaviour of a polypropylene random copolymer geomembrane with phenolic antioxidants-1

Bituminous geomembranes welding methodology-2

Sorption of PFASs onto the geotextile components of geosynthetic clay liners-2

Overview of the advances in geocomposites for the containment of PFAS impacted materials-2

New developments in prevention and protection of water resources-2

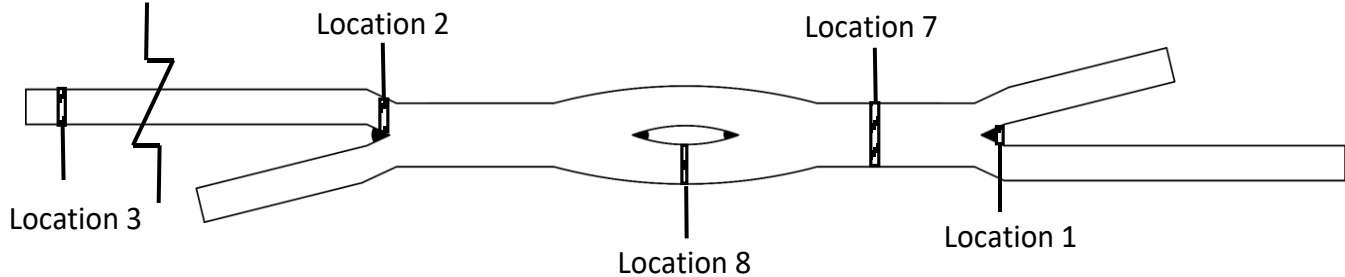
Encapsulation of insitu contamination using an Innovative geosynthetics solution-1

Design of liner system for filter press bauxite residue-2

GMB Seams behaviour, Monash University, Zhang (2014-2017)

Type of welding technique	Welding temperature (°C)	Welding speed (m/min)	Welding start time	Welding finish time
Overheated (HS)	450	1	11:10	11:30
Standard (S)	435	1.5	12:00	12:13
Insufficient heat/pressure (CF)	390	2	11:40	11:50

HS= Heat and Slow, S=Standard; CG = cool and fast

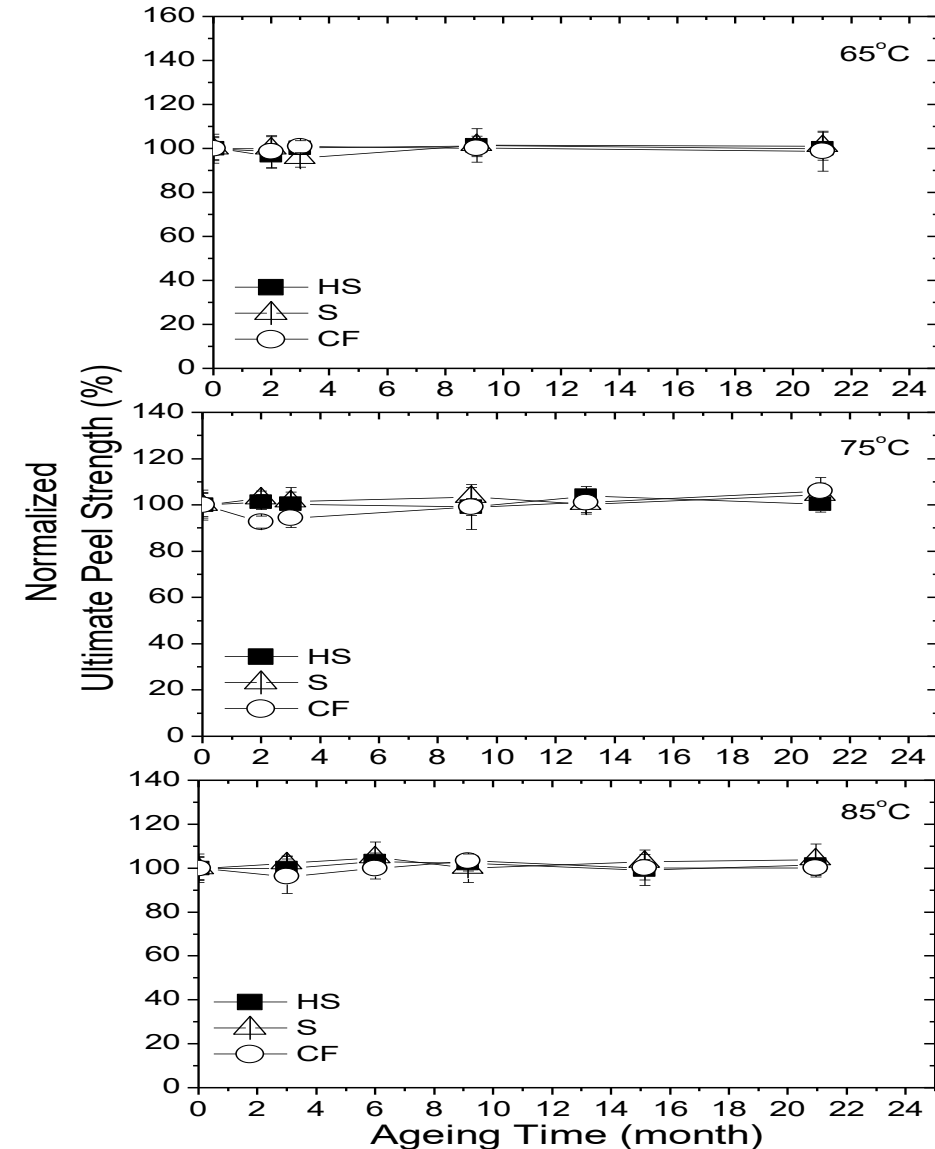


Zhang, L., Bouazza, A., Rowe, R. K., & Scheirs, J. (2017). Effect of welding parameters on properties of HDPE geomembrane seams. *Geosynthetics International*, 24(4), 408-418.

Geomembrane seams behaviour

- Typically > 1500 m of weld/ha
- Welds are a critical location with respect to GMB service-life
- Shear and peel tests are usually performed to obtain quantitative measurements of seam strength.
- Test results are used as acceptance criteria to evaluate the bond strength

GMB Seams behaviour, Monash University, Zhang (2014-2017)

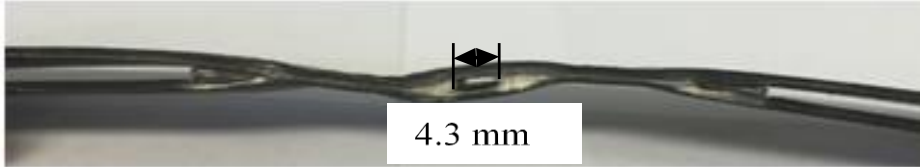
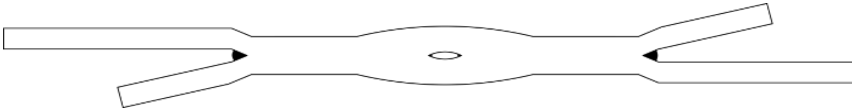


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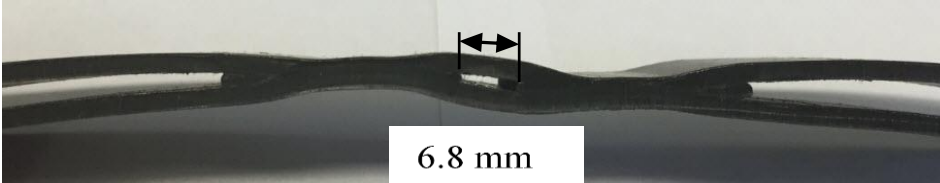
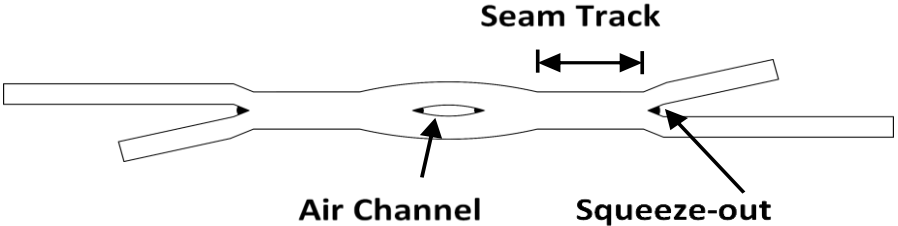
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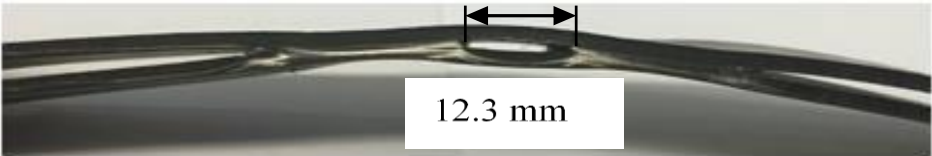
HS



S



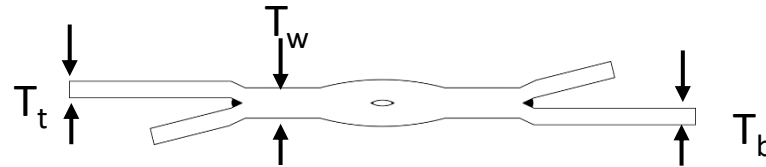
CF



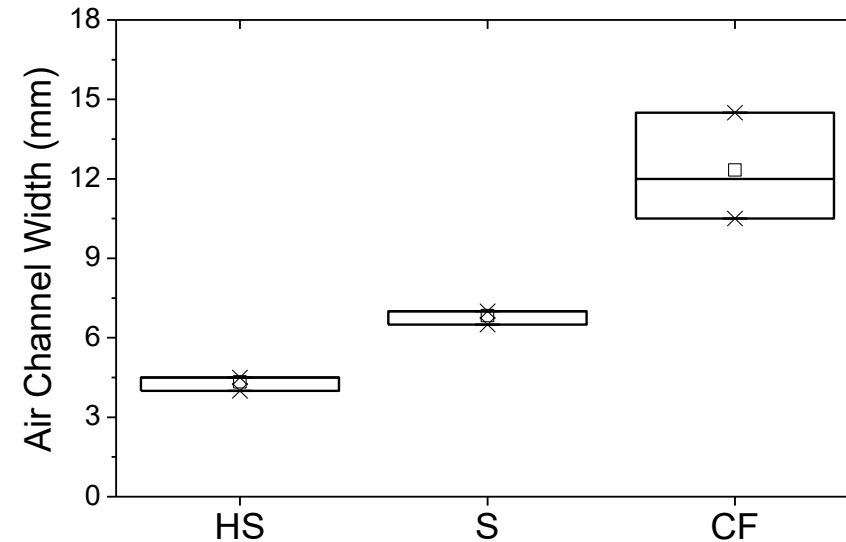
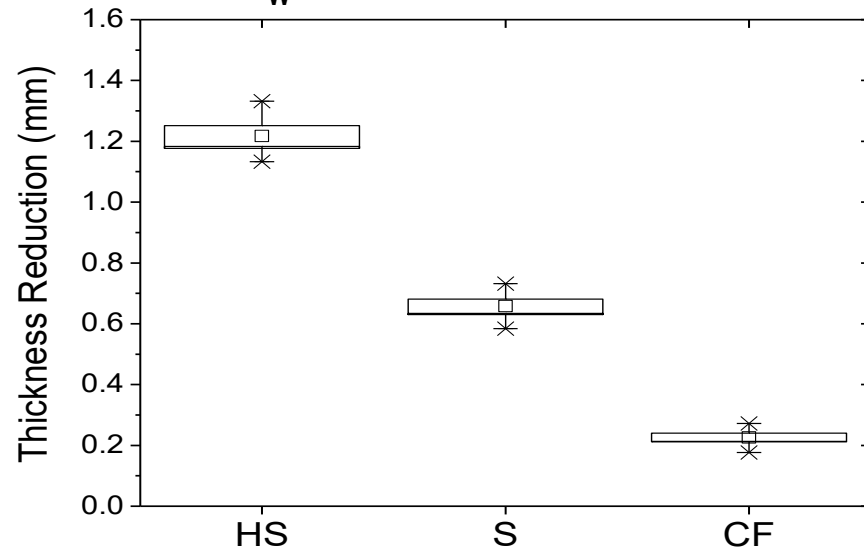
Weld Thickness

- Thickness reduction of the weld can influence its long-term behaviour, particularly its water tightness – Target 0.2 to 0.8 mm for 1.5-2.0 mm HDPE GMBs
- air channel width provides an indication of the quality of the seam

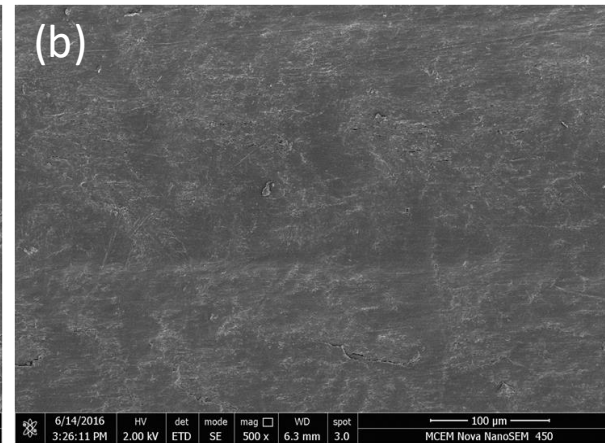
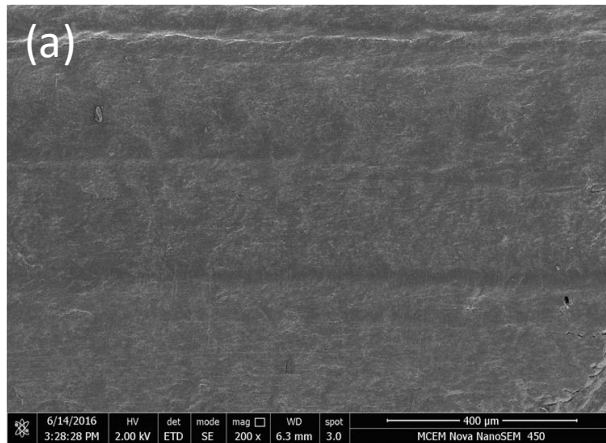
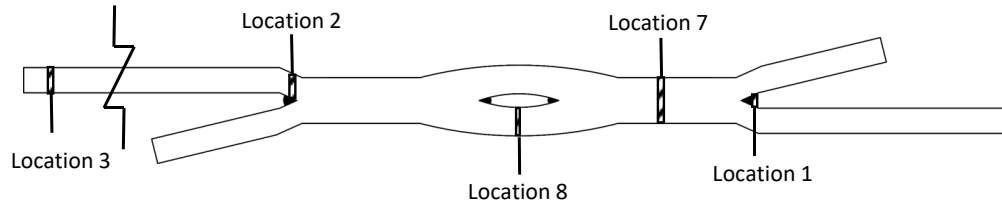
$$T_r = (T_t + T_b) - T_w$$



T_r = thickness reduction, T_t = thickness of the top geomembrane, T_b = thickness of the bottom geomembrane and T_w = thickness of the weld.

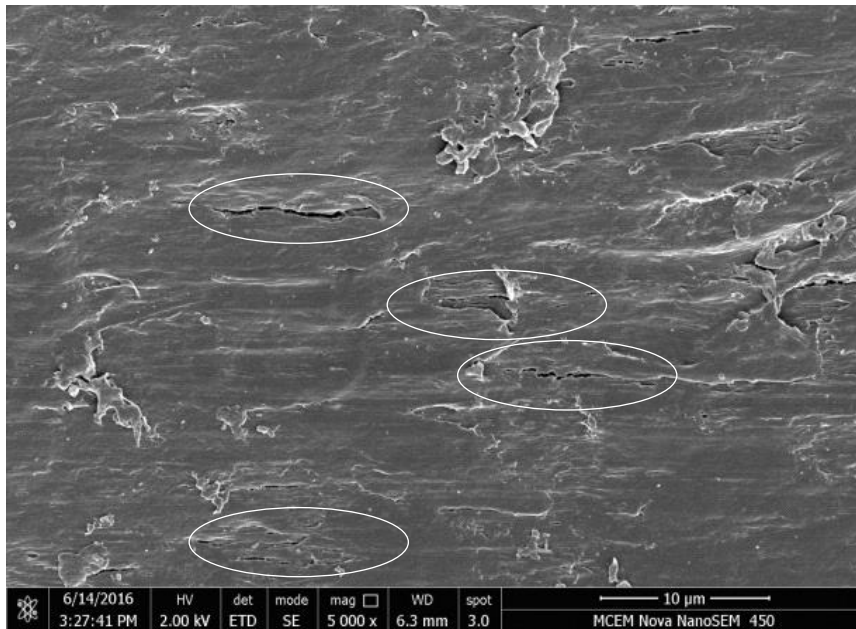
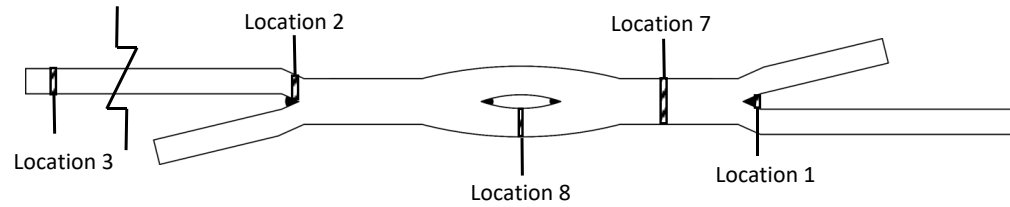


SEM on Heat Affected Zone, condition HS (location 2)



Under low magnification, surface distortion can be observed

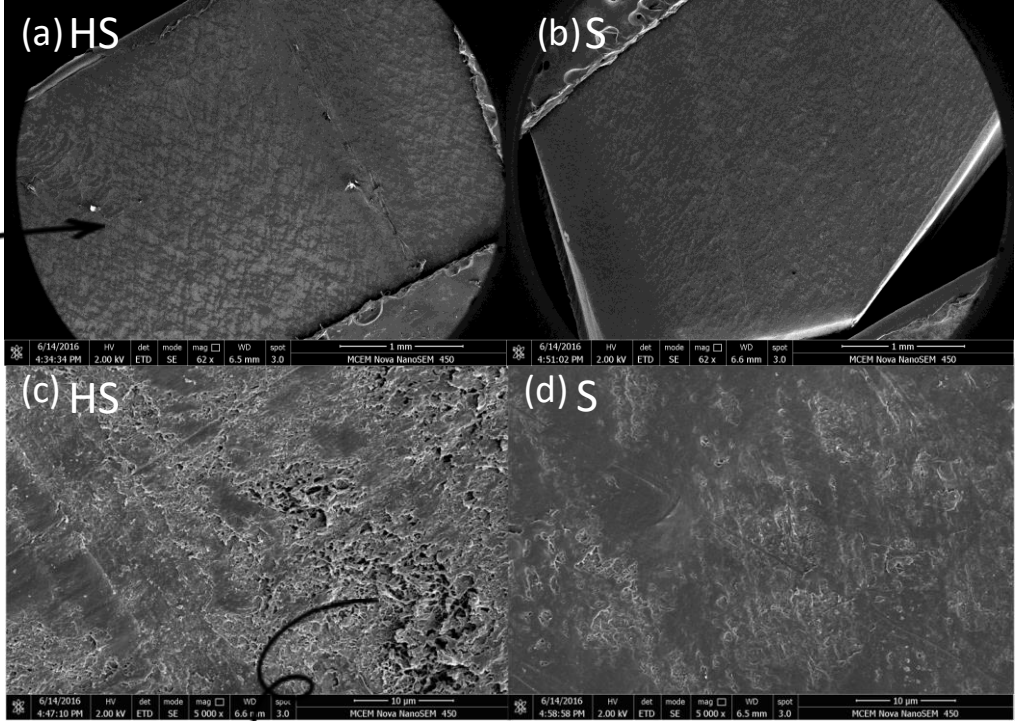
SEM on Heat Affected Zone, condition HS (location 2)



Increasing the magnification, cracks are observed parallel to the weld.

SEM view of seam HS and seam S in acidic condition (pH = 1.5, at 85°C for 628 days)

Higher degree of surface degradation than S



62 x magnification with scale bar of 1mm

5000 x magnification with scale bar of 10μm

Surface peeling

EMERGING CONTAMINANTS

Chemicals that have been detected in water supplies or leachates at trace levels for which the environmental effects are FULLY KNOWN and for which treatment technologies are often untested

Per- and Poly-fluoroalkyl substances (PFASs)



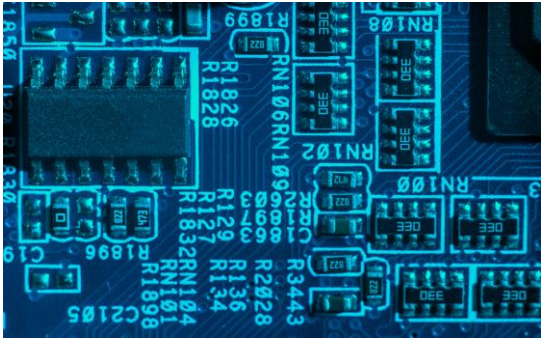
Aqueous Film Forming Foam



Oil & Gas



Energy



Semi Conductors



Pharmaceutical



Healthcare & Hospitals



Apparel



Food packaging

Nearly 75% of water-resistant products contain toxic PFAS, study finds

Nearly 75% of water-resistant products contain toxic PFAS, study finds. Chemicals used in everyday products have been associated with 'a range...

3 weeks ago



Fiber tray for kids meal	■ ■	548.0 ppm
Fiber bowl for grains, salad	■ ■	508.3 ppm
Wrapper for mini Pita, pita Sandwich	■ ■	280.0 ppm
Bag for cookies	■ ■	457.5 ppm
Bag for sides, green stripe	■ ■	876.0 ppm
Bag for sides, red stripe	■ ■	618.0 ppm

California Bans PFAS in Paper-Based Food Packaging

On October 5 and 6, 2021, California Governor Gavin Newsom signed four new bills regulating per- and polyfluoroalkyl substances (PFAS)—regardless of overall molecular structure—in consumer products:

1) Assembly Bill 652 bans PFAS in consumer products designed for children under 12 that are intentionally added or present “at or above 100 part-per-million (ppm), as measured in total organic fluorine,” effective July 1, 2023, with exceptions for electronics, medical devices, and internal components that would not come in direct contact with a child’s skin or mouth.

2) Assembly Bill 1200 bans PFAS in food packaging that is “comprised, in substantial part, of paper, paperboard, or other materials originally derived from plant fibers” that are intentionally added or present at or above 100 ppm, measured as total organic fluorine, effective January 1, 2023. This same bill also requires that cookware be labeled with the chemicals “intentionally added” in manufacturing on the manufacturer’s website as of January 1, 2023, and on the package as of January 1, 2024. Cookware containing PFAS cannot be labelled as “free of any specific chemical if the chemical belongs to a chemical group or

Suggested Points of Discussion

The regulatory framework for emerging contaminants is still in its infancy, what do we need to do as an industry to shape it based on scientific evidence?

What advances in the study of BGMs are needed to address key issues (for example, longevity) or increase their uptake?

Seam testing of BGMs, what's next?

Staple fibres versus continuous filaments for geotextile cushioning function? Safety factor?

Density related flexural fatigue, what is the best density of the GMB?

What is the end of life criteria for PP?

Extreme variability in management of wrinkles in current practice, what are the causes and how best to affect changes as an industry?

Durability tests are in hot air and in hot water? Which one do we need to follow