



ARQ



CONSULTING
ENGINEERS



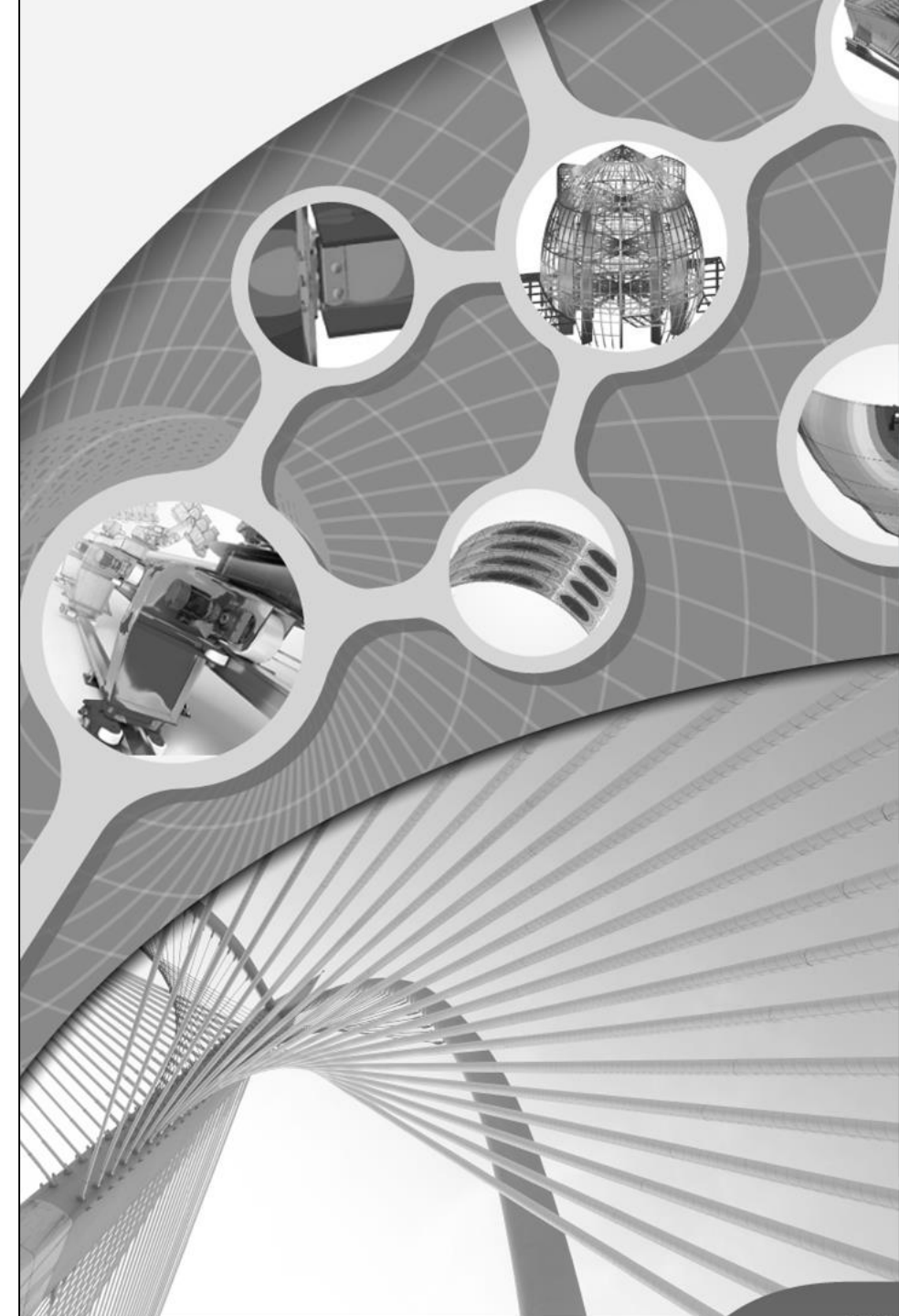
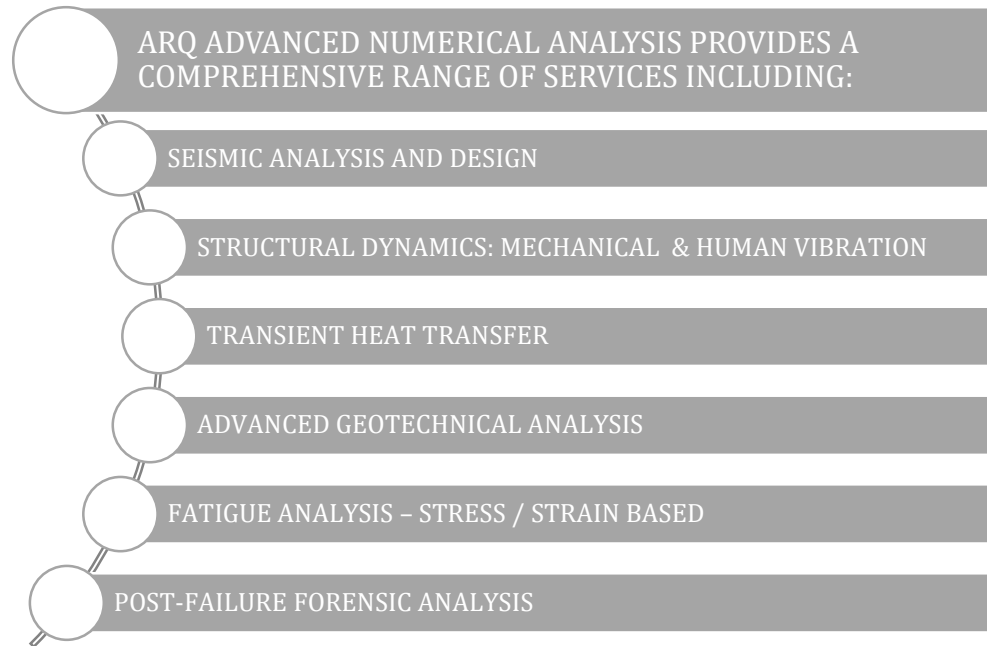
ADVANCED NUMERICAL ANALYSIS

EXPERTISE AND SERVICES

Newly established in 2018, ARQ Advanced Numerical Analysis (ANA) uses innovation to solve complex engineering problems. A key element in this core capability is the ability to simulate and analyse almost any condition or situation and in this regard, the division's primary tool is the finite element (FE) method.

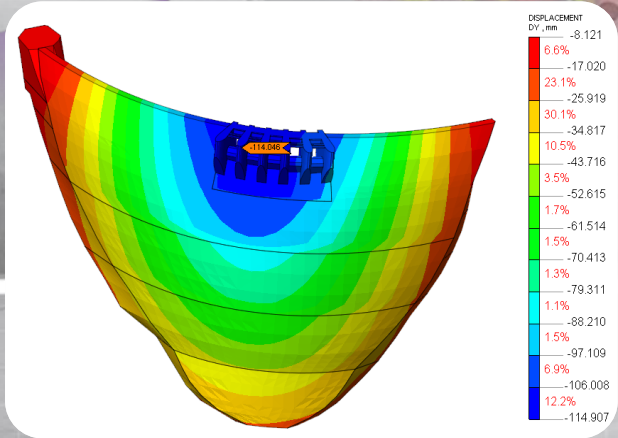
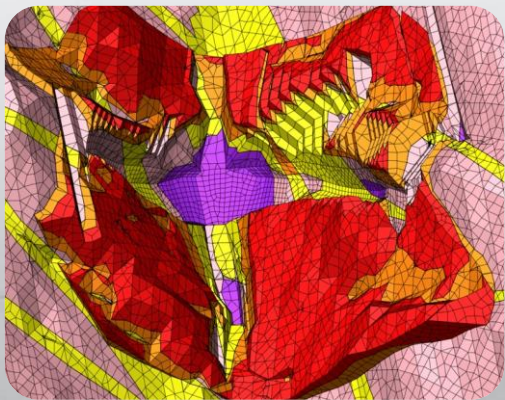
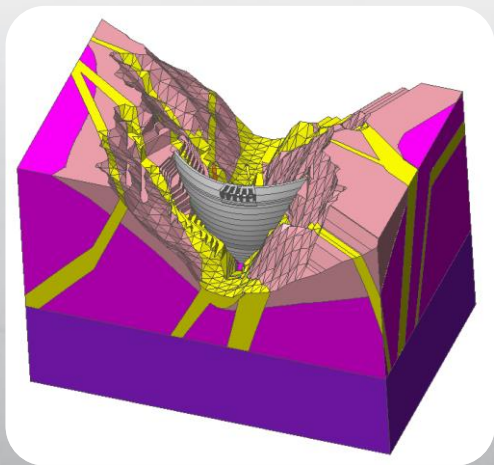
Supported by specialist engineers with an extensive history in translating innovative ideas into practical implementation, ARQ's specialist FE modelers and analysts are equipped with a rare ability to apply the highest level of numerical analysis and structural mechanics to develop optimal solutions in the real world.

ARQ ANA adheres to standards set out by NAFEMS, which is an internationally recognized body for ensuring competence and quality in the field of numerical analysis. Through subscription to the NAFEMS systems, they are able to ensure the highest possible work quality for clients.



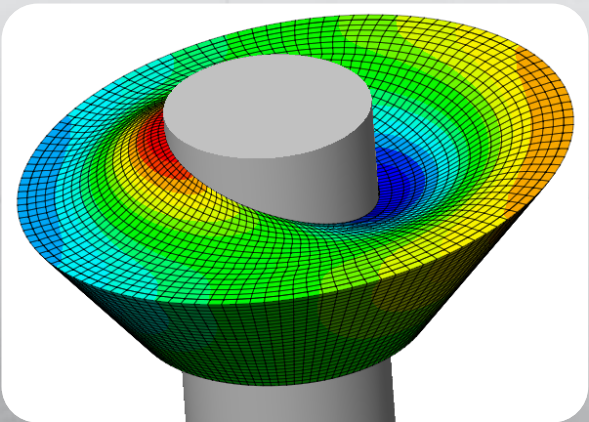
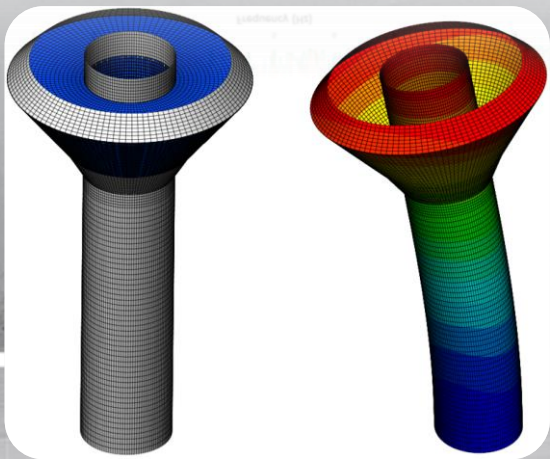
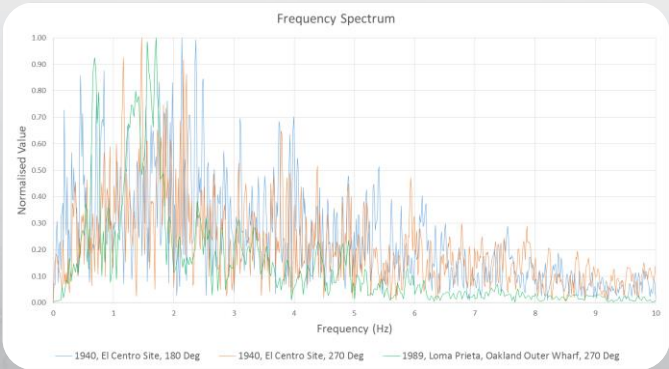
YUSUFELI ARCH DAM

CLIENT: DSI General Directorate of State Hydraulic Works
LOCATION: Çoruh River, Black Sea Region, Turkey
DESCRIPTION: Analysis works for a 275 m high, double-curvature conventional concrete arch dam. Analyses and designs carried out on the project comprises seismic, rock wedge, heat of hydration, post-cooling, staged construction, rock relaxation and fatigue.



ETWATWA WATER TOWER

CLIENT: Bosch Stemele
LOCATION: Ekurhuleni, Gauteng, South Africa
DESCRIPTION: The primary objective of the investigation was to determine the shear force and bending moments at the base of the tower for the relevant seismic loading to be used in the structural design of the tower foundation. As part of the analysis, the bending moments and shear forces in the shaft were calculated to be used in the structural design of the shaft.

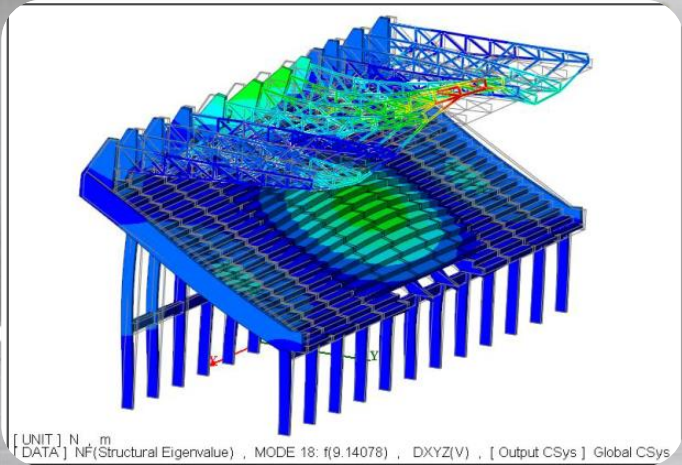
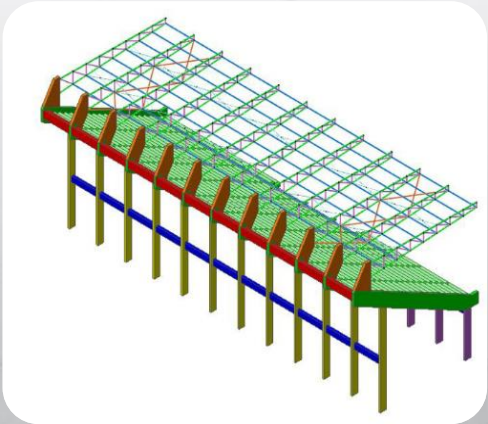
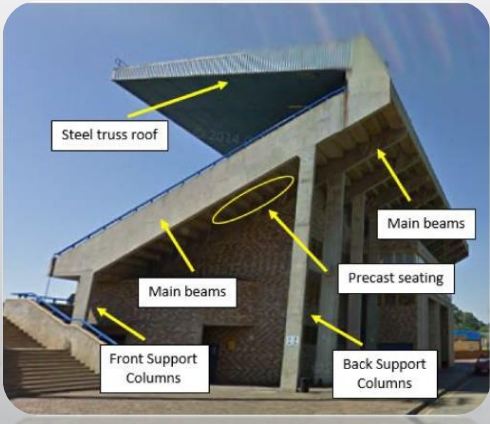


BARNARD STADIUM TRANSIENT CROWD ANALYSIS

CLIENT: Watson Consulting Engineers

LOCATION: Kempton Park, South Africa

DESCRIPTION: The Barnard Stadium had been closed due to unsafe conditions. Unplanned lateral movements had led to structural safety concerns. ARQ ANA was appointed to carry out an analysis to determine the impact of crowd movement toward lateral loading on the supporting columns.

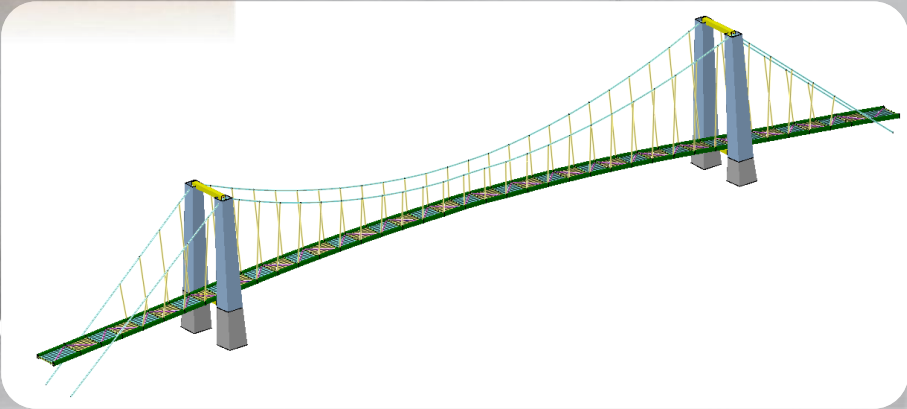
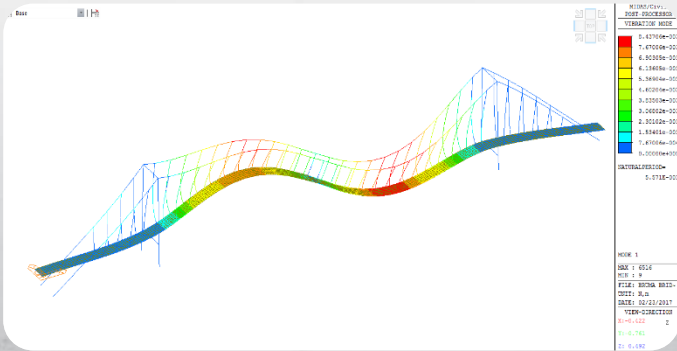


BRUMA PEDESTRIAN BRIDGE

CLIENT: Basil Read

LOCATION: Gauteng, South Africa

DESCRIPTION: The old pedestrian suspension bridge over the Bruma Lake was in a serious state of disrepair. It was badly corroded and needed to be closed to the public temporarily. As part of the redesign, a transient dynamic analysis was carried out to ensure no significant human resonance velocities would be experienced by pedestrians.



Selected Projects

Dams & Hydro		
Projects (Dams)	Client	Country
Yusufeli	DSI – General Directorate of State Hydraulic Works	Turkey (Double curvature CVC arch)
Janneh	Artelia Eau & Environment	Lebanon
Karamursel İhsaniye	CEYSU Construction İnşaat	Turkey
Ratle	Larsen & Toubro Limited	India
Trung Son Dam	AECOM New Zealand	Vietnam
Stieglers Gorge	Hydro Finance	Tanzania (Arch)
Nam Theun 1	Gamuda Berhad	Laos (Arch/gravity)
Köroğlu Dam & HEPP	Unal Construction & Trade Co.Inc.	Turkey
Basha Diamer	WAPDA	Pakistan
Sounda	Independent Dedicated Finance (PTY) Ltd	Rep. Congo (Arch)
Changuinola 1	Changuinola Civil Works Joint Venture	Panama

Bridges		
Projects	Client	Country
Bulembu Bridge	Swaziland Consulting Engineers	Swaziland
2 New Bridges – Rustenburg Interchange	SANRAL / Civil Concepts	South Africa
Jamaica Road – Bridge and Pilling design	LTA & CCC	Jamaica
Vasco Da Gama Bridge over the Jukskei River	Civilcon	South Africa
K101 Bridges	Civilconcepts	South Africa
Swaziland Contract 57 - Maloma - Nsoko Road (MR 14)	Swaziland Consulting Engineers	Swaziland
N3 Paradise Valley to Cedara Interchange	V3 Consulting	South Africa
R52 Koster Section 3	Ilifa Africa Engineers	South Africa
GFIP – Gauteng Freeway Improvement Project	SANRAL	South Africa
Bridge Deck Joint Assessment Agreement South Africa	CSIR	South Africa
Rustenburg Interchange - Extension of old Bridge	Civil Concepts	South Africa

Selected Projects

Geotech		
Projects	Client	Country
Mill Point Development Lateral Support design	Hanssen (Pty) Ltd	Australia
Beefcor – Internal roads and Kraal	Beefcor (Pty) Ltd	South Africa
Klipdrift pipeline N1 pipe jack	LTE Consulting	South Africa
Husab Uranium Mine	AMEC Foster Wheeler & Toubro Limited	Namibia
Gibsonbay Wind Farm	Qunu Consulting	South Africa
Port Louis Ring road slope stabilisation	Colas REHM Grinaker JV (CRGJV)	Mauritius
Booyseendal Mine	Northam Platinum	South Africa
Turbine block foundation at Kusile	Black & Veatch	South Africa
Foundation Design for Boseto Copper Mine	Rockland Geoscience (Pty) Ltd	Botswana
Cross Hole Sonic Logging	GFWA	Australia
Refrigerated Freight Container Terminal - Pavement design	Refrigerated Freight	South Africa

Advanced Numerical Analysis		
Projects	Client	Country
Yusufeli Dam	ARQ Dams / Limak	Turkey
Barnard Stadium	Watson Consulting Engineers	South Africa
Etwatwa Water Tower (Seismic)	Bosch Stemele	South Africa
Bruma Bridge / Dynamic Analysis	ARQ Bridges	South Africa
Spool Thermal Fracture Review	Roto-Plastics (Pty) Ltd	South Africa
Kingdom Resort Clay Swell / Shrinkage Simulation	CPE Developments	South Africa
Kelvin Rd Medium Rise Structure	Union Square Properties (Pty) Ltd	South Africa
Melen Dam	ARQ Dams / DSI	Turkey
Padcal Mine Dam	ARQ Dams / Golder Associates (Pty) Ltd	Philippines

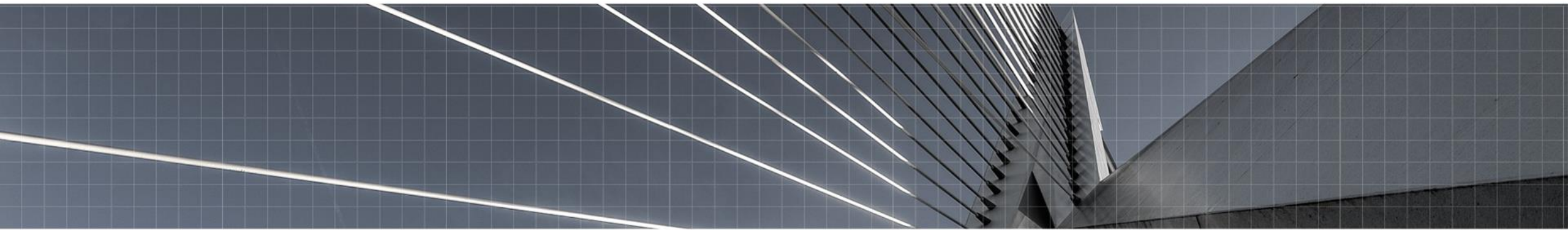
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