



Assured Steel Certification

Towards digital sharing of verified Global Warming Potential data in concrete reinforcing bar

17 Nov 2022

14 - 18
NOVEMBER
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Sunway Pyramid
Convention Centre
Malaysia

2022 SEAIISI
STEEL MEGA
EVENT & EXPO

Technology • Sustainability • Construction

The banner features a central graphic of a circular steel reinforcement bar with a colorful, multi-layered ring around it. The background is a gradient of red and blue with abstract white lines. The text is arranged in a clean, modern layout.

Chin Seng YAP

Regional Operations Manager (East Asia)



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CARES

Contents

- CARES - Assured Services
- Drivers and Context
- Data Challenges and Opportunities
- Digital Constructional Steel Supply Chain
- Project Carbon Footprint



CARES - Assured Services

Product Conformity Certification

- Reinforcing steel – BS 4449, BS 6744, SS560, CS2, ISO6935 plus others (i.e. ASTM)
- Reinforcing steel fabrication – BS 8666 (cut/bend), BS 4483, SS561 (fabric)
- Pre-stressing wire and strand – BS 5896 plus others
- Welding of Reinforcing steel – BS8548 / BS EN ISO 17660
- Approval of PT Installation for Highway Structures
- Approval of PT Installation for non - Highway Structures
- Singapore Specialist Builders – In-Situ Post Tensioning Works
- Alternative Structural Steel to BC1

Management Systems Certification

- Quality Management systems to ISO 9001:2015
- Environmental Management systems to ISO 14001:2015
- Occupational Health and Safety Management systems to ISO 45001:2018

UKCA/UKNI

- Structural steel sections to EN 10025:2004
- Constructional flat steel to EN 10025:2004
- Stainless Steel to EN10088-5:2009
- Pre-cast Concrete to various harmonized standards

Sustainability Certifications

- Sustainable Construction Steel (SCS) Certification (Sector certification scheme UKAS accredited to BS 8902)
- BES 6001 Responsible Sourcing Certification
- ResponsibleSteel Certification
- Environmental Product Declaration to EN 15804 (3rd party verified EPD Report)
- Product carbon foot-printing (CF Report)

Technical approval

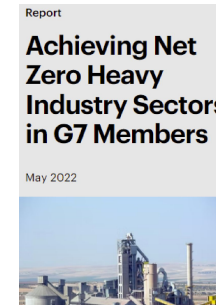
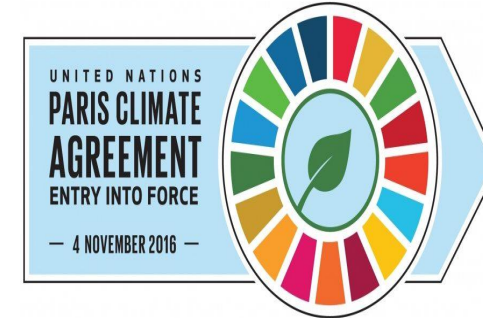
- European Technical Approval of PT kit to EAD 160004
- Coupler approval (*TA1-A to UK Highways Design Manual, TA1-B to BS8597, TA1-C to Sellafield Nuclear Specification*) and TA1-F to ISO 15835)
- Reinforcement Continuity Systems to CARES TA2
- Stud shear Reinforcing Systems to CARES TA7
- Pile Cage Connection Systems to CARES TA15

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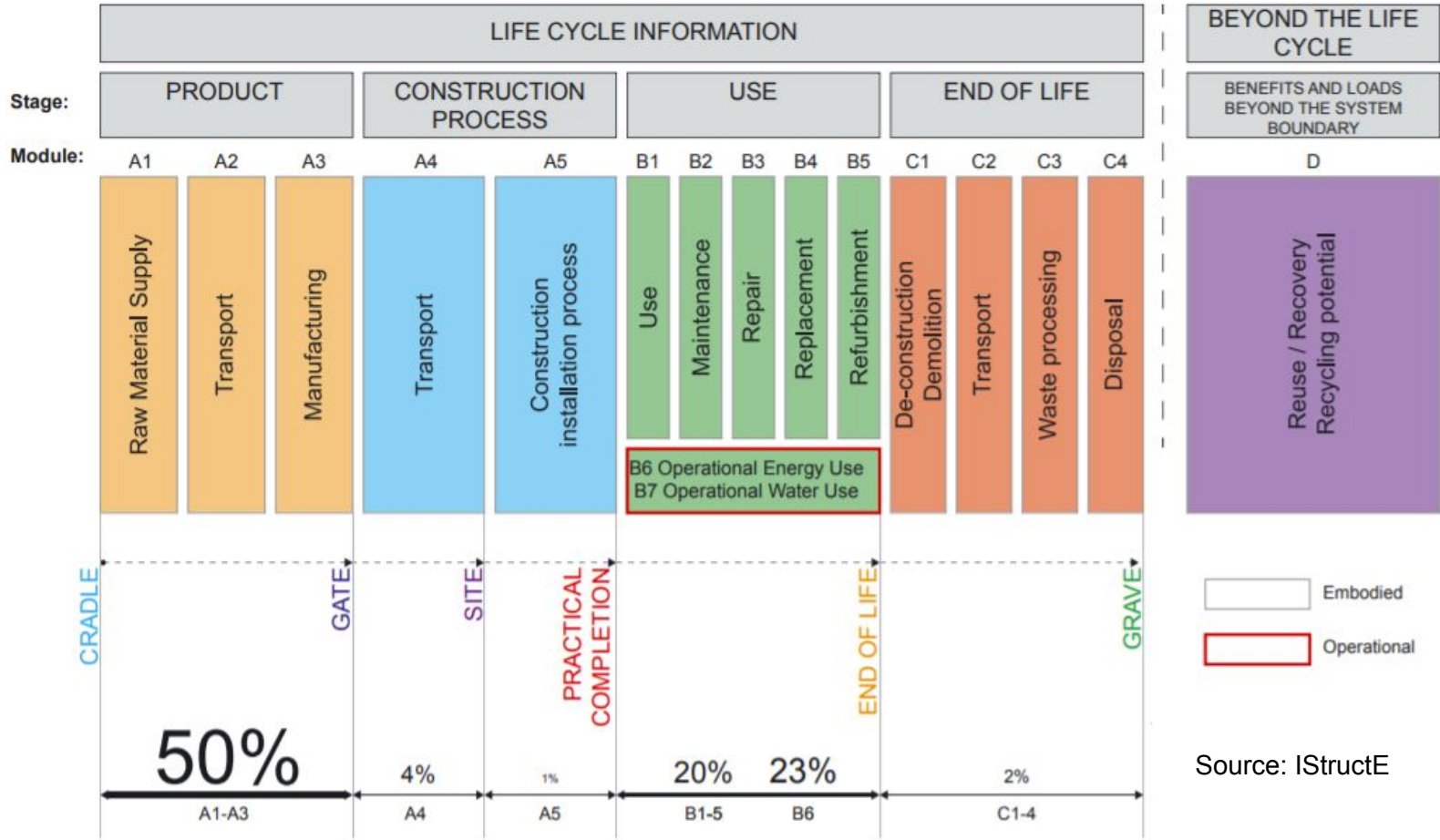
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Drivers and Context

- Recent legislation and policy change
 - e.g. Paris Agreement, UK Climate Change Act, UN Environment Programme, UK Industrial Decarbonisation and Energy Efficiency Roadmaps to 2050, etc.
- Changes in expectations of key construction clients and other stakeholders continue to grow, especially re GHG's
- To keep at the leading edge of sustainability standards
 - CARES Sustainability, ResponsibleSteel, SteelZero, aligned to ISEAL sustainability standards setting codes
- Increased focus on demonstrable performance and not just on having policies and management systems
 - Clients increasingly expecting suppliers to help them meet targets, especially around up-front (embodied) carbon emissions



Life cycle of building: Up-front (Embodied) carbon



- Buildings and construction accounted for 36% of global energy demand and 37% of energy related CO2e emissions in 2020. 10% of which resulted from manufacturing building materials and products such as steel, cement and glass.
- Steel production is responsible for 7- 9% of global warming emissions (worldsteel).
- 52% of global steel production was used in buildings and infrastructure (Approximately half of this being used for reinforcement of concrete).
- 50% of overall from Product Stage (A1-A3).



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Data Challenges and Opportunities

- Worldsteel average GWP (expressed as tonnes CO₂e per tonne of steel product) in 2020 is 1.85.
- The range of GWP from EPD from steel producers approved to the *CARES Sustainable Construction Steels (SCS) certification scheme* is from approximately 0.39 to 2.58 (CARES sector average of these is 0.76 for Scrap / Electric Arc Furnace steel producers).
- Concept and Design stage: Generic averages may offer suitable estimates.
- Procurement stage: More accurate data representing Life cycle GWP based on the specific steel producers as per the EPD.
- Delivery stage: Transport emission data between steel producer and fabricator and carbon footprint data from fabricators should be applied.
- Construction stage: Contractor and client systems and combined with data from other products, this enables a better picture of the actual 'as built' upfront, embodied emissions to be gained.

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

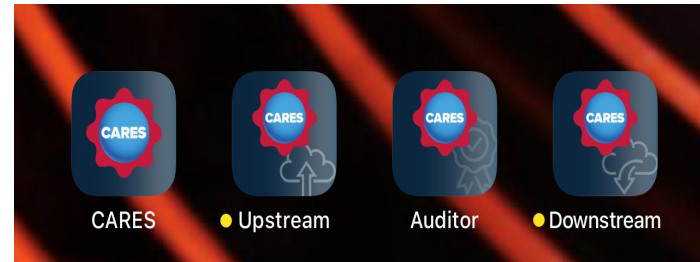
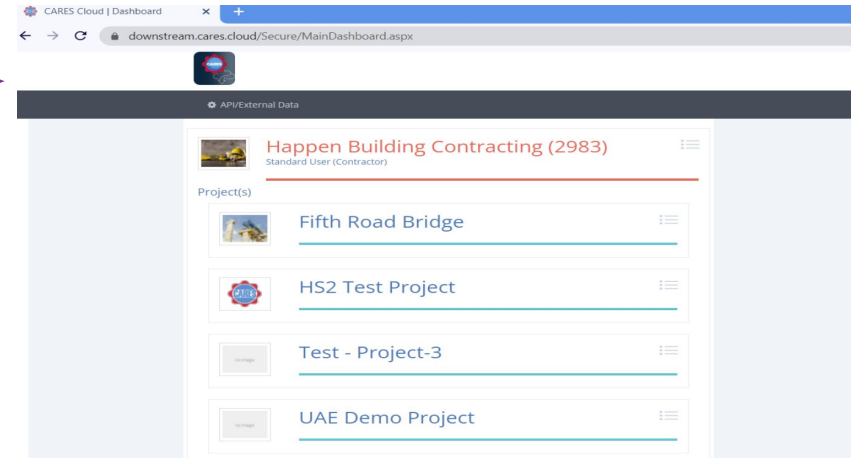
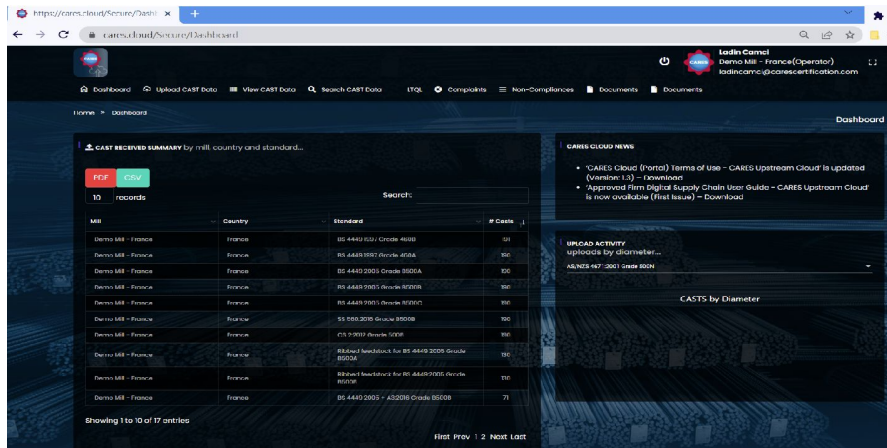
Parameters describing environmental impacts		CO ₂ e							
		GWP	CO ₂ e	AP	EP	POCP	ADPE	ADPF	
		kg CO ₂ e/t	kg CO ₂ e/t	kg POCP/t	kg EP/t	kg POCP/t	kg ADPE/t	kg ADPF/t	
Product stage	Raw material	A1	AGG	AGG	AGG	AGG	AGG	AGG	
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG	
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG	
Total of product stage	A1+A2	750	0.05E-06	0.301	0.004	1.11E-04	8.83E-03		
	A3	17.3	2.72E-15	0.006	0.009	-0.012	1.37E-05	2.27E-02	
Construction process stage	Construction	A6	16.3	1.64E-07	0.010	0.038	0.016	1.28E-05	1.03E-03
	Use	B1	0	0	0	0	0	0	0
Use stage	Maintenance	B2	0	0	0	0	0	0	0
	Repair	B3	0	0	0	0	0	0	0
	Replacement	B4	0	0	0	0	0	0	0
	Refurbishment	B5	0	0	0	0	0	0	0
	Operational energy use	B6	0	0	0	0	0	0	0
	Operational water use	B7	0	0	0	0	0	0	0
End of life	Decommission, demolition	C1	2.05	2.89E-16	0.003	4.22E-04	3.27E-04	5.71E-08	28.3
	Transport	C2	39.6	6.44E-15	0.127	0.032	-0.033	2.94E-06	536
	Waste processing	C3	0	0	0	0	0	0	0
	Dispose	C4	1.19	6.92E-15	0.007	8.09E-04	5.57E-04	4.39E-07	16.7
Potential benefits and costs across the system boundaries	D	361	-2.20E-10	0.824	0.073	0.107	-2.17E-05	2.79E-03	

GWP = Global Warming Potential; CO₂e = Carbon Equivalent Potential; AP = Acidification Potential for Gaseous Acids; EP = Eutrophication Potential; POCP = Formation potential of tropospheric ozone; ADPE = Abiotic Depletion Potential - Elements; ADPF = Abiotic Depletion Potential - Fossil Fuels.

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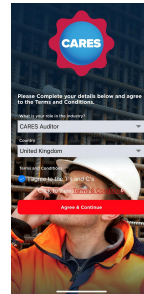
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Digital Steel Supply Chain



- Carbon Reinforcing Steel
- Stainless Reinforcing Steel
- Plain Feedstock Coil
- Ribbed Feedstock Coil
- PC Wire and Strand

- Digital Product Compliance

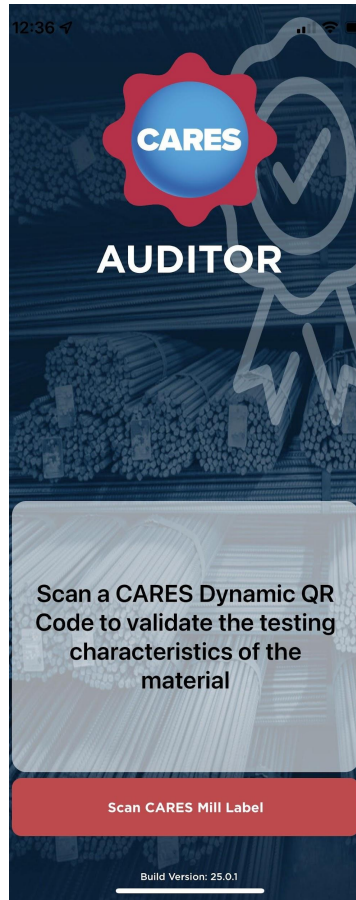


- Scope of Approvals
- Mills Activity
- Fabricators Activity
- Material Compliance Record
- Project Carbon Footprint

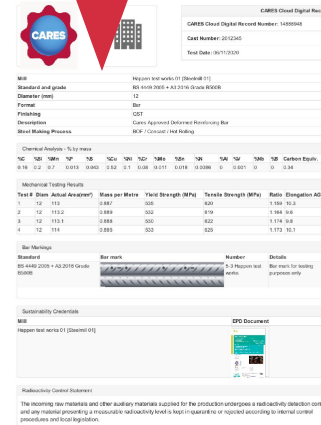
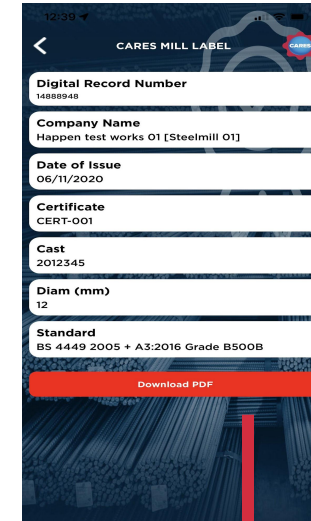
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CARES Upstream Cloud – Digital Record



Mill Cert **CTG-CERT-1103**
 Cast No **1003027**
 Standard **BS 4449 2005 Grade B500B**
 Diameter **20**



Source

Chemical Properties

Mechanical Properties

Bar Marking

Carbon footprint (GWP)

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CARES Downstream Cloud – Project Carbon Footprint

Project Details Supply Chain Activity Events Summary Events Details Assurance Report **Carbon Detail**

GWP A1-A3 & Steel Tonnage / Mill – Pie Chart

Steel Tonnage / Mill – Pie Chart

GWP A1-A3 & Steel Tonnage / Mill – Total

Mill GWP A1-A3 (Kg CO2 Eq.)

Steel Tonnage / Country – Pie Chart

GWP A1-A3 & Steel Tonnage / Country – Total

Carbon Mill Summary

- Steelmill A
- Steelmill B
- Steelmill C

Carbon Delivery Details

Drag a column header here to group its column								
Print Search								
Fabricator	Call off Reference	Delivery Reference	Reference Date	Mill	EPD Scheme	Weight (tonnes)	GWP A1-A3 (kg CO ₂ Eq.)	Total GWP A1-A3 (kg CO ₂ Eq.)
Fabricator A (Site A, Country)	41	202021832	21/01/2021	Steelmill A (Site A, Country)	CARES	12	647	7764
Fabricator B (Site B, Country)	41	202021832	21/01/2021	Steelmill B (Site B, Country)	CARES	23	655	15065
Fabricator A (Site A, Country)	40	202021824	20/01/2021	Steelmill A (Site A, Country)	CARES	3.3	647	2135.1
Fabricator B (Site B, Country)	56	202100153	20/01/2021	Steelmill A (Site A, Country)	CARES	5	647	3235

Carbon Summary

Print Search				
Mill Name	EPD Scheme	Weight (tonnes)	GWP A1-A3 (kg CO ₂ Eq.)	Total GWP A1-A3 (kg CO ₂ Eq.)
Steelmill A (Site A, Country)	CARES	697.9	647	451541.3
Steelmill B (Site B, Country)	CARES	153	438	67014
Steelmill C (Site C, Country)	CARES	280	655	183400
Total:			1,130.9	Total: 701,955.3

Global Warming Potential (GWP - kg CO₂ equivalent per tonne of steel)

Reporting of the Supplying Mills

- CARES SCS (Sustainable Constructional Steel) approved mills hold valid Environmental Product Declaration (EPD) to report GWP
- Other independently third party verified and publicly available EPD to report GWP



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Thank you

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