Tata Steel Norway Byggsystemer AS galvanised steel structural deep deck

Environmental Product Declaration

CONTENTS

Norway Byggsystemer galvanised steel structural deep deck
Environmental Product Declaration
(in accordance with ISO 14025 and EN 15804)

This EPD is representative and valid for the specified (named) product

Declaration Number: EPD-TS-2023-011
Date of Issue: 20th July 2023
Valid until: 30th July 2025

Owner of the Declaration: Tata Steel Norway
Programme Operator: Tata Steel UK Limited, 18 Grosvenor Place, London, SW1X 7HS

The CEN standard EN 15804:2012+A2:2019 serves as the core Product Category Rules (PCR) supported by Tata Steel's EN 15804 verified EPD PCR documents

Independent verification of the declaration and data, according to ISO 14025

Internal ☐ External ☒

Author of the Life Cycle Assessment: Tata Steel UK
Third party verifier: Chris Foster, Eugeos Ltd.

1 General information

Owner of EPD	Tata Steel Norway
Product & modules	Galvanised steel structural deep deck
Manufacturer	Tata Steel Norway
Manufacturing sites	Skien, IJmuiden, Shotton, Port Talbot and Llanwern
Product applications	Construction
Declared unit	1kg of galvanised steel structural deep deck
Date of issue	20th July 2023
Valid until	30th July 2025

EPD
THIRD PARTY VERIFIED ISO 14025 & EN 15804

This Environmental Product Declaration (EPD) is for Tata Steel Norway Byggsystemer's steel structural deep deck manufactured by Tata Steel in Norway. The environmental indicators are for products manufactured at Skien in Norway, with feedstock supplied from Shotton and IJmuiden.

The information in this Environmental Product Declaration is based on production data from 2016, 2017, 2022 and 2023.

EN 15804 serves as the core PCR, supported by Tata Steel's EN 15804 verified EPD programme Product Category Rules documents, and the LCA model (Structural Deck V3) supporting this declaration has been independently verified according to ISO 14025 [1,2,3,4,5,6,7].

Third party verifier

Chris Foster, Eugeos Ltd, Suite 11, The Old Fuel Depot,
Twemlow Lane, Twemlow, CW4 8GJ, UK

2 Product information

2.1 Product description

Tata Steel Norway Byggsystemer AS has two deep deck profile products with different technical characteristics which can be used for many different construction projects and most types of buildings. Deep deck 128R.930 (shown in Figure 1) has a cover width of 930mm and a profile depth of 128mm, to meet the designers' needs for efficiency, aesthetics, and structural performance. Deep deck 200R.856 has a cover width of 856mm and a profile depth of 200mm. The deep deck range are manufactured from galvanised steel with a guaranteed minimum yield stress of 350N/mm^2, and have a fire rating of Class A1 to EN 13501-1 [8].

Our dedicated and experienced technical team are available to help develop a specification for your project and assist with project specific advice to ensure that all design aspects of the chosen deck system meet your project requirements.

Figure 1 Deep deck 128R.930

2.2 Manufacturing

The manufacturing sites included in the EPD are listed in Table 1 below.

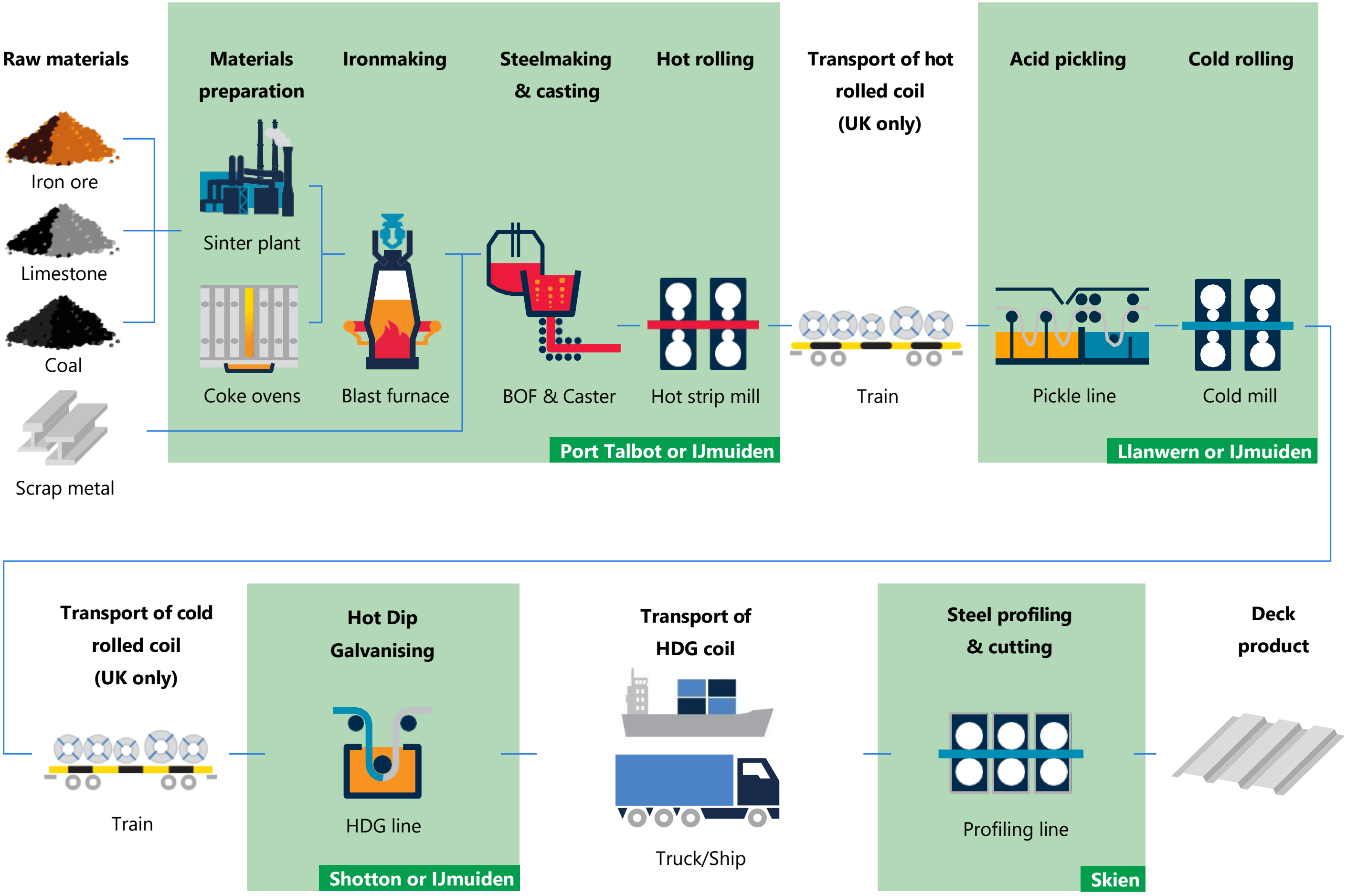
Table 1 Participating sites

Site name	Product	Manufacturer	Country
Port Talbot	Hot rolled coil	Tata Steel	UK
Llanwern	Cold rolled coil	Tata Steel	UK
Shotton	Hot dip galvanised coil	Tata Steel	UK
IJmuiden	Hot rolled coil	Tata Steel	NL
IJmuiden	Cold rolled coil	Tata Steel	NL
IJmuiden	Hot dip galvanised coil	Tata Steel	NL
Skien	Deep deck	Tata Steel	NO

The process of steel coil manufacture at Tata Steel begins with sinter being produced from iron ore and limestone, and together with coke from coal, reduced in a blast furnace to produce iron. Steel scrap is added to the liquid iron and oxygen is blown through the mixture to convert it into liquid steel in the basic oxygen furnace. The liquid steel is continuously cast into discrete slabs, which are subsequently reheated and rolled in a hot strip mill to produce steel coil. In the UK, the hot rolled coils are transported by rail, from Port Talbot to Llanwern where they are pickled and cold rolled and then transported by rail to Shotton where the strip is galvanised. In the Netherlands, these processes are all carried out on the integrated IJmuiden site.

The hot dip galvanised coils are then transported to the deep deck manufacturing facility at Skien in Norway. Coils are transported from the UK to Norway by road and container ship, while coils from the Netherlands are transported to Skien by road and a roll-on roll-off ferry. The zinc coated steel is then profiled and cut into suitable lengths on a dedicated process line. An overview of the process from raw materials to production of the steel deep deck product, is shown in Figure 2.

Figure 2 Process overview from raw materials to deck product



Process data for the manufacture of hot and cold rolled coil at Port Talbot, Llanwern and IJmuiden were gathered as part of the latest worldsteel data collection. For Port Talbot, Llanwern, and IJmuiden, and hot dip galvanising at Shotton, the data collection was not only organised by site, but also by each process line within the site. In this way it was possible to attribute resource use and emissions to each process line, and using processed tonnage data for that line, also attribute resources and emissions to specific products. For the manufacture of the deep deck, process data was also collected from the profiling line at Skien.

2.3 Technical data and specifications

The general properties of the product are shown in Table 2, and the specific products included in this EPD are listed in Table 3.

Table 2 General characteristics and specification of the deep deck

	Norway Byggsystemer galvanised steel deep deck
Thickness of deck (mm)	0.70 to 1.50
Cover width (mm)	856 or 930
Steel grade	S350
Profile weight (kg/m²)	8.81 to 20.50
CE marking	DOP spec to EN 1090-1 [9]

Table 3 Specific deep deck products included in EPD

Product Name	Steel Gauge (mm)	Profile Weight (kg/m²) & Conversion
128.930	0.7	8.81
	0.8	10.06
	0.9	11.32
	1.0	12.58
	1.2	15.10
	1.5	18.87
200.856	0.7	9.57
	0.8	10.93
	0.9	12.30
	1.0	13.67
	1.2	16.40
	1.5	20.50

Note that the profile weights shown in Table 3 are the conversion factors by which the EPD results must be multiplied, to determine impacts per m² for the specific deep deck products listed.

2.4 Packaging

The deep deck profiles are packaged using wood base supports, plastic protective film and plastic strapping in order to protect them during delivery to site and prior to installation. The mass of this packaging is 0.075kg/m² for timber, 0.001kg/m² for plastic film, and 0.001kg/m² for plastic banding.

2.5 Reference service life

A reference service life for structural deck is not declared because the steel profiles are part of a composite roofing system that also comprises an insulating roofing material such as slate or tiles, or felt, and the final construction application of the composite deep deck is not defined. To determine the full service life of steel structural deck, all factors would need to be included such as the type of roof material used, and the location and environment.

The indicative design working life of a structure is classed in accordance with EN 1990 [10] clause 2.3. The design life ranges from category 1 at 10 years, to category 5 at 100 years. Common building structures are classed as category 4 at 50 years. In accordance with EN 1994-1-1 [11], clause 4.2, the exposed surface of the steel decking shall be adequately protected to resist the particular atmospheric conditions. A zinc coating mass of 275g/m² (including both sides) is sufficient for the internal roofs in a non-aggressive environment. Under 'normal' conditions, steel deck would not need to be replaced over the life of the building and structure.

2.6 Biogenic Carbon content

There are no materials containing biogenic carbon in deep deck products. Timber is used to package the deck products and comprises a measurable mass of the total packaging as shown in Table 4 below.

Table 4 Biogenic carbon content at the factory gate

	Norway Byggsystemer deep deck
Biogenic carbon content (product) (kg/m²)	0
Biogenic carbon content (packaging) (kg/m²)	0.0375

Note: 1kg biogenic carbon is equivalent to 44/12 kg of CO_2

3 LCA methodology

3.1 Declared unit

The unit being declared is 1kg of steel structural deck.

3.2 Scope

This EPD can be regarded as Cradle-to-Gate (with options) and the modules considered in the LCA are;

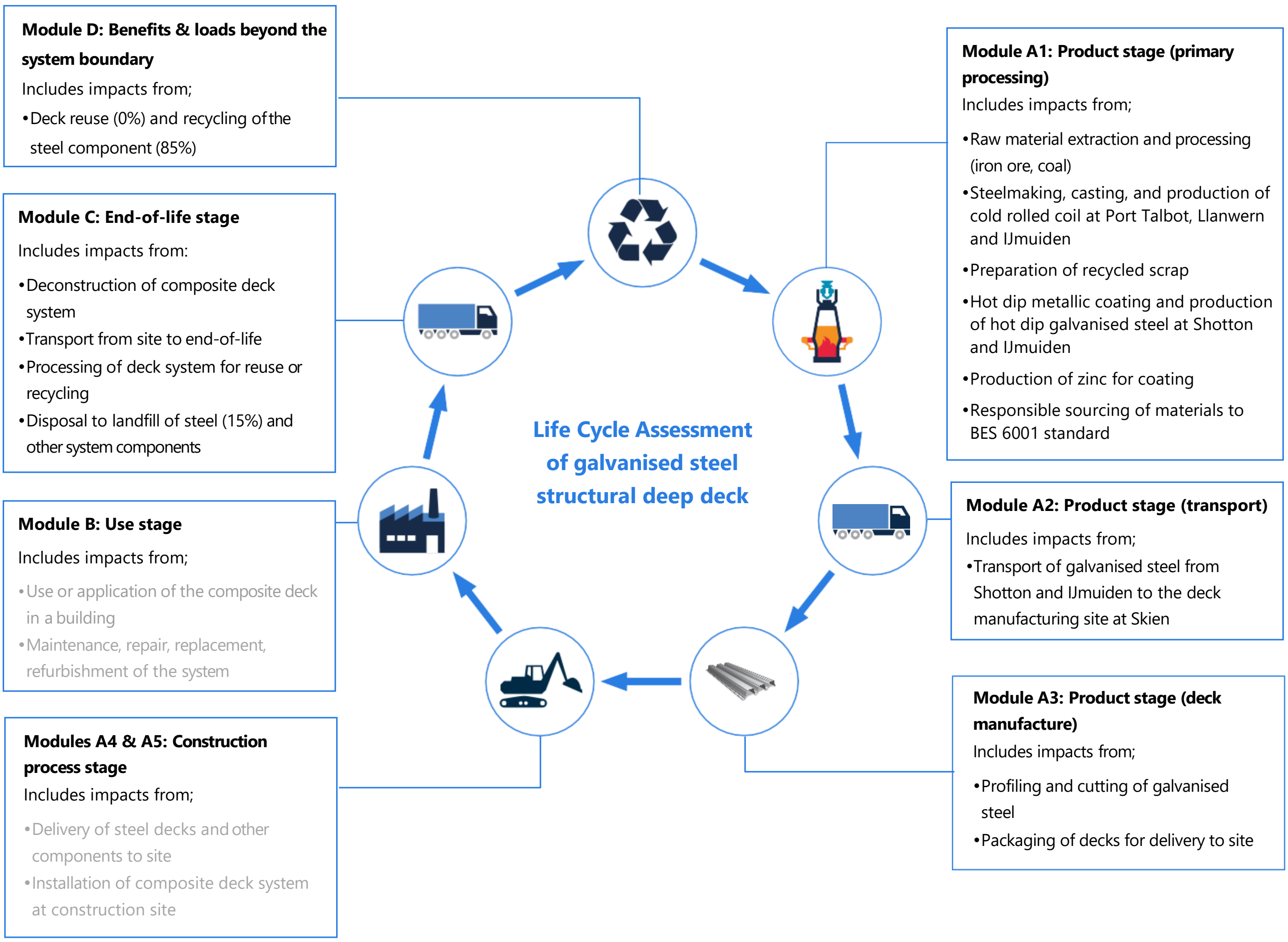
A1-A3: Production stage (Raw material supply, transport to production site, manufacturing)
C1-C4: End-of-life (Deconstruction, transport, processing for recycling and disposal)
D: Reuse, recycling and recovery

All of the life cycle stages are explained in more detail in Figure 3, but where the text is in light grey, the impacts from this part of the life cycle are not considered for this particular product.

3.3 Cut-off criteria

All information from the data collection process has been considered, covering all used and registered materials, and all fuel and energy consumption. On-site emissions were measured and those emissions have been considered. Data for all relevant sites were thoroughly checked and also cross-checked with one another to identify potential data gaps. No processes, materials or emissions that are known to make a significant contribution to the environmental impact of the steel deck have been omitted. On this basis, there is no evidence to suggest that input or outputs contributing more than 1% to the overall mass or energy of the system, or that are environmentally significant, have been omitted. It is estimated that the sum of any excluded flows contribute less than 5% to the impact assessment categories. The manufacturing of required machinery and other infrastructure is not considered in the LCA.

Figure 3 Life Cycle Assessment of steel deck



3.4 Background data

For life cycle modelling of steel deck, the Sphera LCA for Experts Software System for Life Cycle Engineering (formerly GaBi) is used [12]. The LCA FE database contains consistent and documented datasets which can be viewed in the online Managed LCA Content (MLC) documentation [13].

Where possible, specific data derived from Tata Steel's own production processes were the first choice to use where available.

To ensure comparability of results in the LCA, the basic data of the Sphera MLC were used for energy, transportation and auxiliary materials.

3.5 Data quality

The data from Tata Steel's own production processes are from 2016, 2017, 2022 and 2023, and the technologies on which these processes were based during that period, are those used at the date of publication of this EPD. All relevant background datasets are taken from the Sphera MLC, and the last revision of all but three of these datasets took place less than 10 years ago. However, the contribution to impacts of these datasets is small and relatively insignificant, and therefore, the study is considered to be based on good quality data.

It should be noted that the deck manufacturing data from TS Norway Byggsystemer was collected over the first few months of operation of a new process line, and is not based upon one year of production. However, these data have been sense-checked and are considered to be typical of this manufacturing process. Further data will be collected after one year of line operation.

3.6 Allocation

To align with the requirements of EN 15804, a methodology is applied to assign impacts to the production of slag and hot metal from the blast furnace (co-products from steel manufacture), that was developed by the World Steel Association and EUROFER [14]. This methodology is based on physical and chemical partitioning of the manufacturing process, and therefore avoids the need to use allocation methods, which are based on relationships such as mass or economic value. It takes account of the manner in which changes in inputs and outputs affect the production of co-products and also takes account of material flows that carry specific inherent properties. This method is deemed to provide the most representative method to account for the production of blast furnace slag as a co-product.

Economic allocation was considered, as slag is designated as a low value co-product under EN 15804. However, as neither hot metal nor slag are tradable products upon leaving the blast furnace, economic allocation would most likely be based on estimates. Similarly BOF slag must undergo processing before being used as a clinker or cement substitute. The World Steel Association and EUROFER also highlight that companies purchasing and processing slag work on long term contracts which do not follow regular market dynamics of supply and demand.

Process gases arise from the production of the continuously cast steel slabs at Port Talbot and IJmuiden and are accounted for using the system expansion method. This method is also referenced in the same EUROFER document and the impacts of co-product allocation, during manufacture, are accounted for in the product stage (Module A1).

End-of-life assumptions for recovered steel and steel recycling are accounted for as per the current methodology from the World Steel Association 2017 Life Cycle Assessment methodology report [15]. A net scrap approach is used to avoid double accounting, and the net impacts are reported as benefits and loads beyond the system boundary (Module D).

3.7 Additional technical information

The main scenario assumptions used in the LCA are detailed below in Table 5. The end of life percentages are based upon the results of a survey carried out by the Steel Construction Institute in 2000 [16].

For all indicators the characterisation factors from the EC-JRC are applied, identified by the name EN_15804, and based upon the EF Reference Package 3.0 [17]. In LCA FE, the corresponding impact assessment is used, denoted by EN 15804 +A2.

3.8 Comparability

Care must be taken when comparing EPDs from different sources. EPDs may not be comparable if they do not have the same functional unit or scope (for example, whether they include installation allowances in the building), or if they do not follow the same standard such as EN 15804. The use of different generic data sets for upstream or downstream processes that form part of the product system may also mean that EPDs are not comparable.

Comparisons should ideally be integrated into a whole building assessment, in order to capture any differences in other aspects of the building design that may result from specifying different products. For example, a more durable product would require less maintenance and reduce the number of replacements and associated impacts over the life of the building.

Table 5 Main scenario assumptions

Module	Scenario assumptions
A1 to A3 – Product stage	Manufacturing data from Tata Steel's sites at Port Talbot, Llanwern, IJmuiden, Shotton and Skien are used.
A2 – Transport to the deck manufacturing site	The deck manufacturing facilities are located at Skien in Norway. From Shotton, the hot dip galvanised coils are taken 235km to the port of Immingham and then 896km by ship to Brevik in Norway. The final transport is also by road, 36km to Skien. From IJmuiden the coils are taken by ferry a distance of 890km to Halmstad in Sweden. From Halmstad, road transport is used to travel the 557km to Skien. All road transport is on a 28 tonne payload truck and a utilisation factor of 45% was assumed to account for empty returns.
C1 – Deconstruction & demolition	Energy consumption estimated based upon published data for the dismantling of steel constructions in Germany [18]
C2 – Transport for recycling, reuse, and disposal	A transport distance of 100km to landfill or to a recycling site is assumed. Transport is on a 25 tonne load capacity lorry with 15% utilisation to account for empty returns
C3 – Waste processing for reuse, recovery and/or recycling	Steel deck that is recycled is processed in a shredder
C4 - Disposal	At end-of-life, 15% of the steel is disposed in a landfill, based upon the findings of an SCI survey
D – Reuse, recycling, and energy recovery	At end-of-life, 85% of the steel is recycled based upon the findings of a SCI survey

Please note that in the LCA FE software, an empty return journey is accounted for by halving the load capacity utilisation of the outbound journey.

4 Results of the LCA

Description of the system boundary

Product stage			Construction stage		Use stage							End-of-life stage				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse Recovery Recycling
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

X = Included in LCA; ND = module not declared

Environmental impact:

1kg of galvanised steel structural deep deck

Parameter	Unit	A1 – A3	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	2.73E+00	6.64E-03	2.17E-02	1.03E-02	2.17E-03	-1.33E+00
GWP-fossil	kg CO_2 eq	2.74E+00	8.59E-03	2.17E-02	1.03E-02	2.24E-03	-1.33E+00
GWP-biogenic	kg CO_2 eq	-8.59E-03	-2.23E-03	-2.12E-04	-9.54E-05	-6.63E-05	-7.54E-04
GWP-luluc	kg CO_2 eq	3.87E-04	2.82E-04	1.46E-04	4.88E-05	4.13E-06	-2.90E-05
ODP	kg CFC11 eq	1.61E-12	1.33E-14	2.13E-15	2.34E-13	5.25E-15	-3.15E-15
AP	mol H^+ eq	8.66E-03	3.43E-05	8.44E-05	3.31E-05	1.59E-05	-2.35E-03
EP-freshwater	kg P eq	1.32E-06	1.51E-07	7.73E-08	3.57E-08	3.80E-09	-2.88E-07
EP-marine	kg N eq	1.98E-03	8.08E-06	3.94E-05	6.14E-06	4.06E-06	-4.55E-04
EP-terrestrial	mol N eq	2.11E-02	1.02E-04	4.40E-04	6.59E-05	4.46E-05	-4.59E-03
POCP	kg NMVOC eq	7.00E-03	2.72E-05	7.61E-05	1.76E-05	1.23E-05	-2.04E-03
ADP-minerals&metals	kg Sb eq	1.83E-04	4.45E-09	2.18E-09	3.70E-09	2.30E-10	-3.29E-06
ADP-fossil	MJ net calorific value	3.04E+01	5.81E-01	2.84E-01	2.08E-01	2.93E-02	-1.30E+01
WDP	m^3 world eq deprived	1.25E-01	6.24E-04	2.42E-04	2.00E-03	2.46E-04	-3.62E+00
PM	Disease incidence	ND	ND	ND	ND	ND	ND
IRP	kBq U235 eq	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	ND	ND	ND	ND	ND	ND
SQP		ND	ND	ND	ND	ND	ND

GWP-total = Global Warming Potential total
GWP-fossil = Global Warming Potential fossil fuels
GWP-biogenic = Global Warming Potential biogenic
GWP-luluc = Global Warming Potential land use and land use change
ODP = Depletion potential of stratospheric ozone layer
AP = Acidification potential, Accumulated Exceedance
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment
EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment
EP-terrestrial = Eutrophication potential, Accumulated Exceedance
POCP = Formation potential of tropospheric ozone
ADPE = Abiotic depletion potential for non-fossil resources
ADPF = Abiotic depletion potential for fossil resources
WDP = Water (user) deprivation potential, deprivation-weighted water consumption
PM = Potential incidence of disease due to PM emissions
IRP = Potential Human exposure efficiency relative to U235
ETP-fw = Potential Comparative Toxic Unit for ecosystems
HTP-c = Potential Comparative Toxic Unit for humans
HTP-nc = Potential Comparative Toxic Unit for humans
SQP = Potential soil quality index

The following indicators should be used with care as the uncertainties on these results are high or as there is limited experience with the indicator : ADP-minerals&metals, ADP-fossil, and WDP.

Resource use:

1kg of galvanised steel structural deep deck

Parameter	Unit	A1 – A3	C1	C2	C3	C4	D
PERE	MJ	3.13E+00	4.44E-02	1.97E-02	5.95E-02	4.40E-03	8.15E-01
PERM	MJ	1.11E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.24E+00	4.44E-02	1.97E-02	5.95E-02	4.40E-03	8.15E-01
PENRE	MJ	3.04E+01	5.83E-01	2.85E-01	2.08E-01	2.93E-02	-1.30E+01
PENRM	MJ	2.15E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	3.04E+01	5.83E-01	2.85E-01	2.08E-01	2.93E-02	-1.30E+01
SM	kg	6.98E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	4.02E-03	5.03E-05	2.27E-05	8.56E-05	7.45E-06	-8.43E-02

PERE = Use of renewable primary energy excluding renewable primary energy resources in material

PERM = Use of renewable primary energy resources in material

PERT = Total use of renewable primary energy resources

PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources in material

PENRM = Use of non-renewable primary energy resources in material

PENRT = Total use of non-renewable primary energy resources

SM = Input of secondary material

RSF = Use of renewable secondary fuels

NRSF = Use of non-renewable secondary fuels

FW = Use of net fresh water

Output flows and waste categories:

1kg of galvanised steel structural deep deck

Parameter	Unit	A1 – A3	C1	C2	C3	C4	D
HWD	kg	2.47E-04	4.06E-12	1.51E-12	1.91E-09	1.51E-12	2.83E-09
NHWD	kg	1.76E-01	1.03E-04	4.65E-05	1.14E-04	3.00E-01	1.65E-01
RWD	kg	3.29E-04	2.85E-06	5.30E-07	2.64E-05	3.26E-07	1.41E-06
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	1.29E-03	0.00E+00	0.00E+00	7.80E-01	0.00E+00	0.00E+00
MER	kg	9.68E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

HWD = Hazardous waste disposed

NHWD = Non-hazardous waste disposed

RWD = Radioactive waste disposed

CRU = Components for reuse

MFR = Materials for recycling

MER = Materials for energy recovery

EEE = Exported electrical energy

EET = Exported thermal energy

5 Interpretation of results

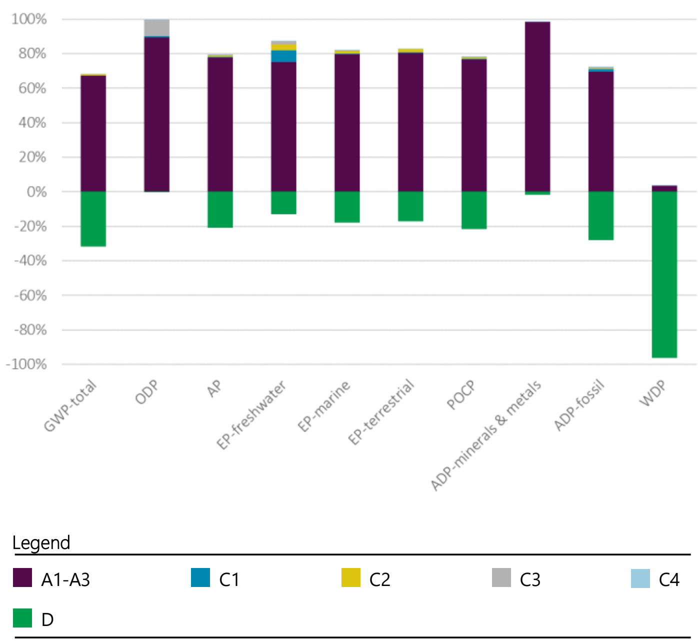
Figure 4 shows the relative contribution per life cycle stage for each of the environmental impact categories for 1kg of Tata Steel BS Norway's deep deck product. Each column represents 100% of the total impact score, which is why all the columns have been set with the same length. A burden is shown as positive (above the 0% axis) and a benefit is shown as negative (below the 0% axis). The main contributors across all but one of the impact categories are A1-A3 (burdens) and D (benefits beyond the system boundary). The manufacture of the cold rolled coil during stage A1-A3 is responsible for approximately 90% of each impact in most of the categories, specifically, the conversion of iron ore into liquid steel which is the most energy intensive part of the overall deck manufacturing process. The exception to this is the Ozone Depletion Potential indicator, where the manufacture of the zinc that coats the steel is a significant contributor to the total impact (60%) mainly from emissions of dichloro-1-fluoroethane.

The primary site emissions come from the use of coal and coke in the blast furnace, and from the injection of oxygen into the basic oxygen furnace, as well as combustion of the process gases. These processes give rise to emissions of CO_2, which contribute over 90% of the Global Warming Potential (GWP), and sulphur oxides, which are responsible for 57% of the impact in the Acidification Potential (AP) category. In addition, oxides of nitrogen are emitted which contribute 42% of the A1-A3 Acidification Potential, and almost all of the Eutrophication Potential (EP-marine and EP-terrestrial). The combined emissions of nitrogen oxides (69%) and carbon monoxide (22%) together with sulphur oxides and methane, contribute to the Photochemical Ozone indication (POCP).

Figure 4 clearly indicates the relatively small contribution to each impact from the other life cycle stages, which are deconstruction and dismantling, transport of the decks to their end-of-life fate, processing of the steel scrap for recycling, and disposal to landfill. The most significant of these contributions is from stage C3 to the Ozone Depletion Potential (ODP) indicator and this comes from the impact of shredding of the steel deck prior to recycling.

Module D values are largely derived using worldsteel's value of scrap methodology which is based upon many steel plants worldwide, including both BF/BOF and EAF steel production routes. At end-of-life, the recovered steel deck is modelled with a credit given as if it were re-melted in an Electric Arc Furnace and substituted by the same amount of steel produced in a Blast Furnace [15]. The specific emissions that represent the burden in A1-A3, are essentially the same as those responsible for the impact benefits in Module D. It is important that the life cycle of the steel product is considered here, because in most cases, the Module D credit provides significant benefits in terms of reducing the whole life environmental impacts.

Figure 4 LCA results for the deep deck profile



Referring to the LCA results, the impact in Module D for the Use of Renewable Primary Energy indicator (PERT) is different to the other impact categories, being a burden or load rather than a benefit. Renewable energy consumption is strongly related to the use of electricity, during manufacture, and as the recycling (EAF) process uses significantly more electricity than primary manufacture (BF/BOS), there is a positive value for renewable energy consumption in Module D but a negative value for non-renewable energy consumption.

It is worth noting that for both the water deprivation potential indicator (WDP) and the use of net fresh water category (see results tables), Module D is a benefit, but the magnitude of this benefit is far greater than the impact from Modules A1-A3. This is highlighted by the rightmost bar in Figure 4 and is explained by the Module D benefit for the two water indicators being based upon the worldsteel calculation mentioned previously. Port Talbot and IJmuiden, the biggest water users in this study, are relatively modest users of fresh water as reported in A1-A3. The worldwide average calculation for Module D includes many sites with considerably greater fresh water use in A1-A3 than either Port Talbot or IJmuiden.

6 References and product standards

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2. Tata Steel's EN 15804 verified EPD programme, Product Category Rules Part 1, V2 January 2022

3. Tata Steel's EN 15804 verified EPD programme, Product Category Rules Part 2 – Steel Structural Deck, V2 June 2022

4. ISO 14044:2006, Environmental management - Life Cycle Assessment - Requirements and guidelines

5. ISO 14025:2010, Environmental labels and declarations - Type III environmental declarations - Principles and procedures

6. ISO 14040:2006, Environmental management - Life Cycle Assessment - Principles and framework

7. EN 15804:2012+A2:2019, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

8. EN 13501-1:2007+A1:2009, Fire classification of construction products and building elements. Classification using test data from reaction to fire tests

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