



# NETL Life Cycle Inventory Data

## Process Documentation File

**Process Name:** Shuttle Car Construction  
**Reference Flow:** 1 pcs of Shuttle Car, Construction  
**Brief Description:** The amount of steel used in the construction of one shuttle car to be used to haul coal from the working mine face to the conveyor belt in underground mining.

### Section I: Meta Data

**Geographical Coverage:** US **Region:** Southern Illinois  
**Year Data Best Represents:** 2007  
**Process Type:** Basic Process (BP)  
**Process Scope:** Gate-to-Gate Process (GG)  
**Allocation Applied:** No  
**Completeness:** Individual Relevant Flows Captured

#### Flows Aggregated in Data Set:

Process  Energy Use  Energy P&D  Material P&D

#### Relevant Output Flows Included in Data Set:

Releases to Air:  Greenhouse Gases  Criteria Air  Other  
Releases to Water:  Inorganic  Organic Emissions  Other  
Water Usage:  Water Consumption  Water Demand (throughput)  
Releases to Soil:  Inorganic Releases  Organic Releases  Other

#### Adjustable Process Parameters:

Steel\_Cold\_Roll *[kg/pcs] Kilograms of cold-rolled steel per pieces of shuttle car (one shuttle car)*  
Shut\_Car\_Const *[pcs/pcs] Pieces of shuttle car per pieces of shuttle car (reference flow of one shuttle car)*

**Tracked Input Flows:**

Steel cold rolled, PE

*[Technosphere]***Tracked Output Flows:**

Shuttle Car, Construction [Insert]

*Reference flow*

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**Section II: Process Description**

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**Associated Documentation**

This unit process is composed of this document and the data sheet (DS) *Stage1\_C\_Shuttle\_Car\_Construction\_2015.01.xlsx*, which provides additional details regarding relevant calculations, data quality, and references.

**Goal and Scope**

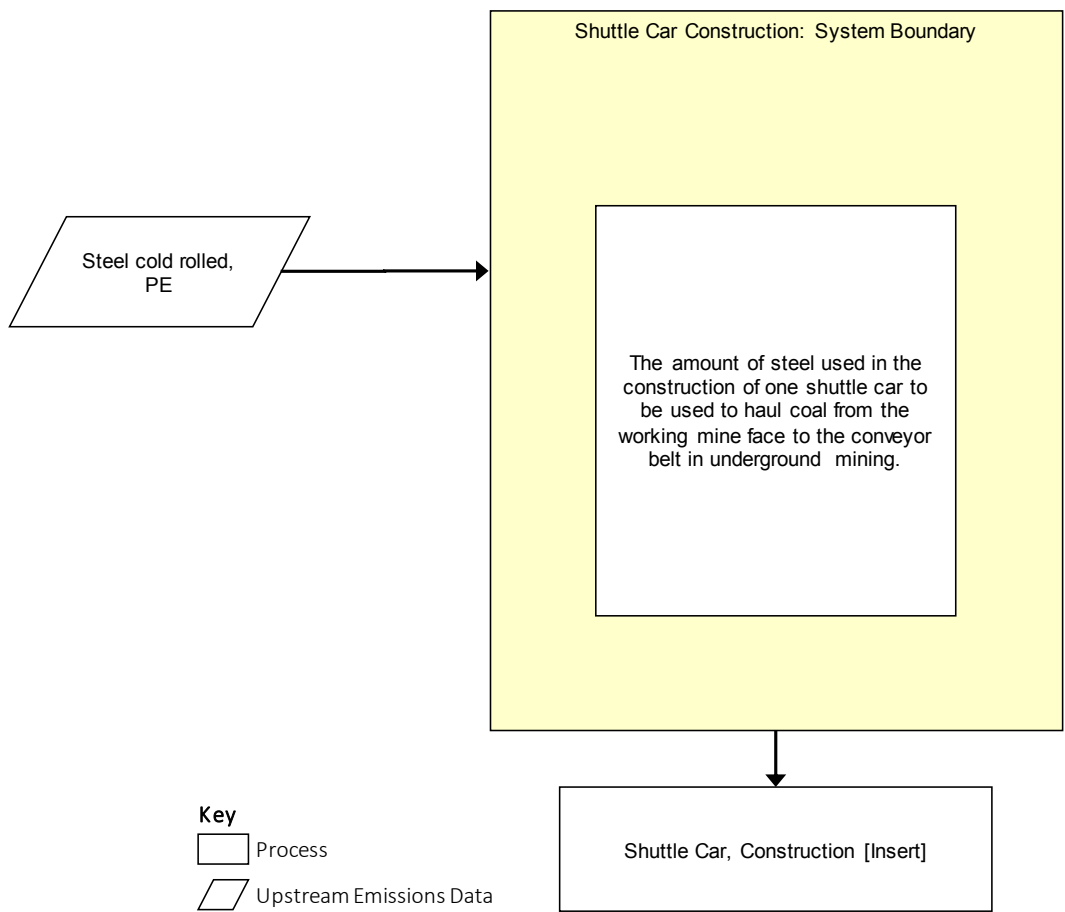
This unit process provides a summary of relevant input and output flows associated with the construction of an underground coal mine shuttle car. Inputs include cold-rolled steel and outputs include one shuttle car. The reference flow of this unit process is: 1 pcs of Shuttle Car, Construction

**Boundary and Description**

Shuttle cars are used in underground coal mining to move excavated coal from the excavated coal face to conveyor belts. This unit process includes the major materials and the masses of those materials required to construct one coal shuttle car. The data for the shuttle car comes from manufacturer specifications for shuttle cars (Phillips Machine Service, 2007a, 2007b, 2007c, 2007d). Cold-rolled steel is the assumed input material.

The mass of the shuttle car is based on its empty weight. Batteries for the shuttle car were not separated from the overall weight of the car and, as a result, battery weight is included in the total weight of steel required for the shuttle car. This is a data limitation. The weights of four different sizes of shuttle cars from Phillips Machine Service were obtained and averaged. The cars ranged in capacity from 7.2 cubic meters to 16.1 cubic meters. Each car has an empty weight between 24.5 and 32.7 metric tonnes (Phillips Machine Service, 2007a, 2007b, 2007c, 2007d). These minimum and maximum values were averaged to calculate an average of 28.6 metric tonnes, the empty weight of a single shuttle car.

**Figure 1: Unit Process Scope and Boundary**



**Table 1: Unit Process Input and Output Flows**

Flow Name	Value	Units (Per Reference Flow)
<b>Inputs</b>		
Steel cold rolled, PE	28,600.00	kg
<b>Outputs</b>		
Shuttle Car, Construction [Insert]	1.00	pcs

\* **Bold face** clarifies that the value shown *does not* include upstream environmental flows.

**Embedded Unit Processes**

None.

**References**

Phillips Machine Service 2007a	Phillips Machine Service. (2007). The Freedom Car Family: FC12 Shuttle Coal Hauler. Phillips Machine Service. <a href="http://www.phillipsmachine.com/pdf/FC12.PDF">http://www.phillipsmachine.com/pdf/FC12.PDF</a> (accessed December 14, 2009).
Phillips Machine Service 2007b	Phillips Machine Service. (2007). The Freedom Car Family: FC16 Shuttle Coal Hauler. Phillips Machine Service. <a href="http://www.phillipsmachine.com/pdf/FC16.PDF">http://www.phillipsmachine.com/pdf/FC16.PDF</a> (accessed December 14, 2009).
Phillips Machine Service 2007c	Phillips Machine Service. (2007). The Freedom Car Family: FC20 Shuttle Coal Hauler. Phillips Machine Service. <a href="http://www.phillipsmachine.com/pdf/FC20.PDF">http://www.phillipsmachine.com/pdf/FC20.PDF</a> (accessed December 14, 2009).
Phillips Machine Service 2007d	Phillips Machine Service. (2007). The Freedom Car Family: FC25 Shuttle Coal Hauler. Phillips Machine Service. <a href="http://www.phillipsmachine.com/pdf/FC25.PDF">http://www.phillipsmachine.com/pdf/FC25.PDF</a> (accessed December 14, 2009).



**Section III: Document Control Information**

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**Date Created:** September 3, 2015

**Point of Contact:** Timothy Skone (NETL), Timothy.Skone@NETL.DOE.GOV

**Revision History:**

Original/no revisions

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**Section IV: Disclaimer**

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