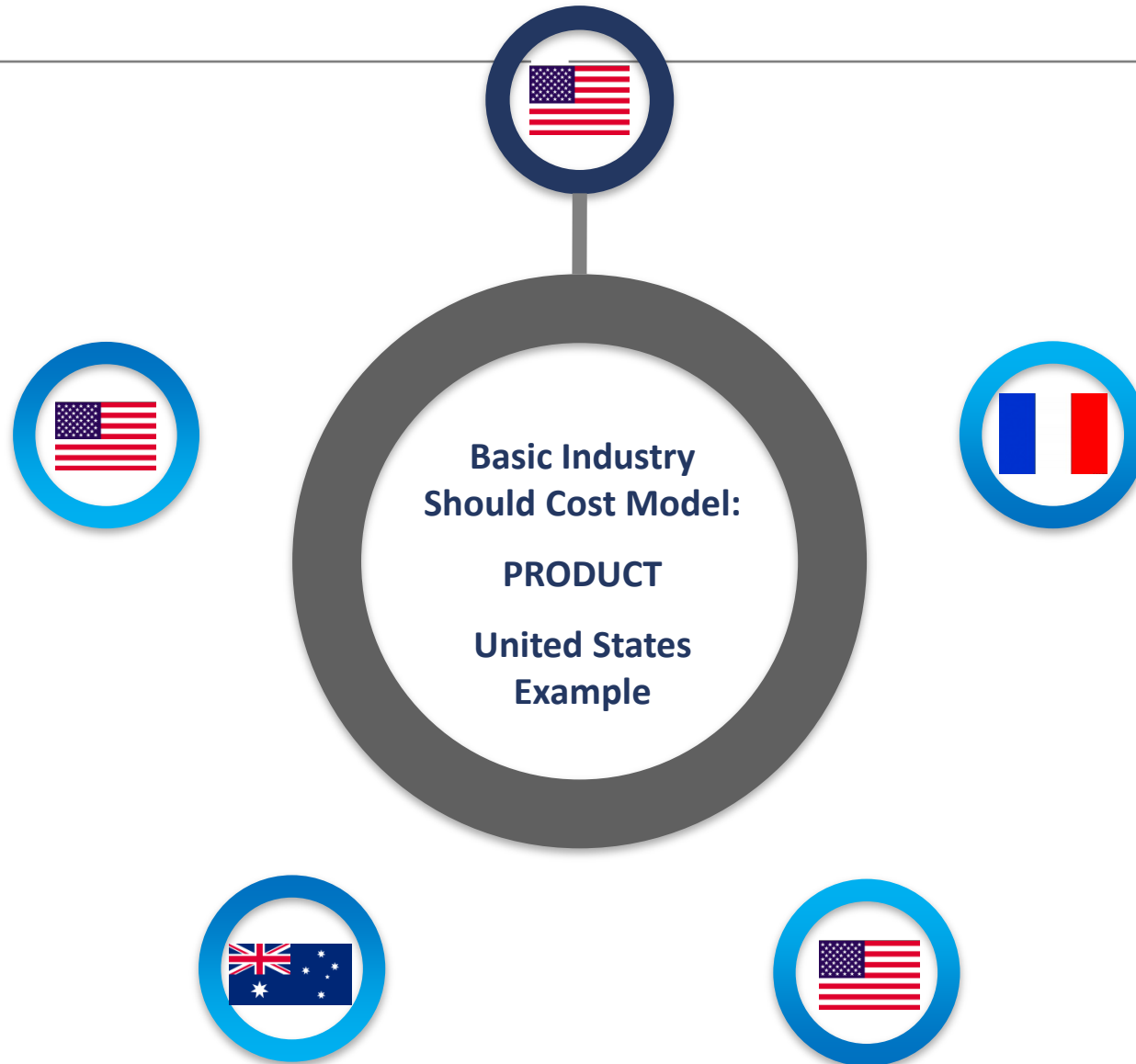


# COST MODEL EXAMPLES

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## Scenario: Line Pipe Example

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- Western Oil Company is currently purchasing line pipe for an upcoming pipeline expansion project
- Each section of pipe required is 12 meters and requires **2.8 tonnes of cold rolled coil steel** per section
- The supply manager has received a quotation of **\$8,500 per section** from a large supplier located in the US and has been tasked by the director of procurement to validate the proposed price.



## Build an Industry Cost Profile

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Identify industry code based on the supplier's business and product. (e.g. Business: Iron & Steel Pipe and Tube Manufacturing)

1

Identify data sources for financial and manufacturing information related to industry code

2

Use financial data to calculate ratios for: Cost of Goods Sold, Profit Before Tax and GSA & Other Expenses

3

Use manufacturing data to calculate ratios for: Direct Material, Direct Labor and Manufacturing Overhead

4

# Build an Industry Cost Profile

## 1. Identify industry code based on the supplier's business and product

(e.g. Business: Iron & Steel Pipe and Tube Manufacturing, Product: Steel Pipe)

### Types of Industry Code Systems

- **NAICS (North America)**, NACE (Europe), SIC, ISIC (United Nations), SSIC (Singapore), NIC (India), etc.

### NAICS/SIC SEARCH RESULTS

steel pipe NAICS Search 🔍

Enter Keyword(s) SIC Search 🔍

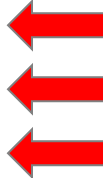
NAICS	NAICS Title	Common Keywords	SIC Crosswalk
331210	Iron and Steel Pipe and Tube Manufacturing from Purchased Steel	Pipe (e.g., heavy riveted, lock joint, seamless, welded) made from purchased iron or steel	<a href="#">View SIC</a>
332996	Fabricated Pipe and Pipe Fitting Manufacturing	Fabricated pipe and pipe fittings made from purchased pipe	<a href="#">View SIC</a>
326122	Plastics Pipe and Pipe Fitting Manufacturing	Fittings and unions, rigid plastics pipe, manufacturing	<a href="#">View SIC</a>
331110	Iron and Steel Mills and Ferroalloy Manufacturing	Pipe, iron or steel, made in iron and steel mills	<a href="#">View SIC</a>
331221	Rolled Steel Shape Manufacturing	Bars, steel, made from purchased steel in cold rolling mills	<a href="#">View SIC</a>
332111	Iron and Steel Forging	Steel forgings made from purchased steel, unfinished	<a href="#">View SIC</a>

**NAICS Code: 331210, Iron and Steel Pipe and Tube Manufacturing from Purchased Steel**

## Build an Industry Cost Profile

### 2. Identify data sources for financial and manufacturing information related to industry code

Direct Material	
Direct Labor	
Manufacturing Overhead	
Cost of Goods Sold	
GSA & Other Expenses	
Profit Before Tax	
<b>PRICE</b>	<b>100%</b>



- Financial information consolidators
  - [Risk Management Association \(RMA\)](#), Dun & Bradstreet (D&B), Hoovers, Orbis (Bureau Van Dijk), Yahoo Finance, Reuters et al
- Company financial statements
  - Annual Reports, 10-K's, 20-F's, financials on website
- Government sites
  - Germany statistics site – Genesis database
  - US [Annual Survey of Manufacturers](#)

Note: To access a variety of data sources go to [Anklesaria Learning Academy](#)

# Build an Industry Cost Profile

## Tenaris S.A. - Income Statement (Profit and Loss account)

Tenaris S.A. Consolidated Financial Statements for the years ended December 31, 2020, 2019 and 2018

### Consolidated Income Statement

All amounts in thousands of U.S. dollars, unless otherwise stated

YEAR ENDED DECEMBER 31	Notes	2020	2019	2018
<b>CONTINUING OPERATIONS</b>				
Net sales	1	5,146,734	7,294,055	7,658,588
Cost of sales	2	(4,087,317)	(5,107,495)	(5,279,300)
<b>Gross profit</b>		<b>1,059,417</b>	<b>2,186,560</b>	<b>2,379,288</b>
Selling, general and administrative expenses	3	(1,119,227)	(1,365,974)	(1,509,976)
Impairment charge	5	(622,402)	—	—
Other operating income	6	33,393	23,004	15,059
Other operating expenses	6	(14,252)	(11,199)	(12,558)
<b>Operating (loss) income</b>		<b>(663,071)</b>	<b>832,391</b>	<b>871,813</b>
Finance income	7	18,387	47,997	39,856
Finance cost	7	(27,014)	(43,381)	(36,942)
Other financial results	7	(56,368)	14,667	34,386
<b>(Loss) income before equity in earnings of non-consolidated companies and income tax</b>		<b>(728,066)</b>	<b>851,674</b>	<b>909,113</b>
Equity in earnings of non-consolidated companies	13	108,799	82,036	193,994
<b>(Loss) income before income tax</b>		<b>(619,267)</b>	<b>933,710</b>	<b>1,103,107</b>
Income tax	8	(23,150)	(202,452)	(229,207)
<b>(Loss) income for the year</b>		<b>(642,417)</b>	<b>731,258</b>	<b>873,900</b>

## Build an Industry Cost Profile

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### 3. Calculate ratios for:

- Cost of Goods Sold
- Profit
- GSA & Other Expenses

Data from Income Statement (P/L Account) for 3 Companies from the last 3 Financial Years

	Tenaris	US Steel Corp	Welspun	Average
<b>Revenue</b>	100.0%	100.0%	100.0%	100.0%
<b>COGS</b>	72.8%	92.8%	81.4%	82.3%
<b>SGA</b>	22.2%	11.0%	10.5%	14.5%
<b>PBT</b>	5.1%	-3.7%	8.1%	3.2%

## Build an Industry Cost Profile

Industry Cost Profile:

**Iron and Steel Pipe and Tube Manufacturing from Purchased Steel**

Element	%
Direct Material	
Direct Labor	
Manufacturing Overhead	
<b>Cost of Goods Sold</b>	<b>82.3%</b>
GSA & Other Expenses	14.5%
Profit Before Tax	3.2%
<b>PRICE</b>	<b>100%</b>



# Build an Industry Cost Profile

## EXTRACT FROM ANNUAL SURVEY OF MANUFACTURERS

**Total value of Shipments:**  
11,610,268

**Production Workers Wages:**  
1,006,209

**Total Cost of Materials:**  
7,132,487

GEO_ID	NAME	GEO_ID_F	NAICS2011	NAICS2012	NAICS2013	YEAR	RCPTOT	RCPTOT_S	PAYANN	PAYANN_P	PAYQTR1	PAYQTR1_P	EMP	EMP_S	EMPQ1PW	EMPQ1PW_P	HOURS	HOURS_S	PAYANPW	PAYANPW_P	BENEFIT	BENEFIT_S	BENHEA	BENHEA_S	BENPEB	BENPEB_S	BENPEC	BENPEC_S
01000000	United States		331210	Iron and steel mills and ferroalloy foundries		2020	11610268	0.6	1489161	0.5	418261	0.3	24641	1.2	19474	1.3	35366	0.9	1006209	0.6	473091	0.6	232597	0.8	19668	1.1	34603	
									Relative standard error for estimate of sales, value of shipments, or revenue					Relative standard error for estimate of number of employees					Relative standard error for estimate of production workers annual wages									
									Relative standard error for estimate of total cost of materials					Relative standard error for estimate of cost of purchased fuels					Relative standard error for estimate of cost of purchased electricity									

**Cost of Purchased Fuels:**  
46,312

**Purchased Electricity:**  
156,194

"The Economic Census is indispensable to understanding America's economy. It ensures the accuracy of the statistics we rely on for sound economic policy and for successful business planning." --*Alan Greenspan, Former Chairman of the Federal Reserve Board of Governors*

## Build an Industry Cost Profile

### 4. Calculate ratios for:

- Direct Labor
- Direct Materials
- Manufacturing Overhead

<b>Calculate Direct Labor (DL) as a % of sales</b> (Prod worker wages / Total value of shipments)	$= 1,006,209 / 11,610,268$ $= \mathbf{8.7\%}$
<b>Calculate Direct Material</b> Source: Annual Survey of Manufactures: (Total cost of materials – Purchased fuels & elec)	$= 7,132,487 - (46,312 + 156,194)$ $= 6,929,981$
<b>Calculate Direct Material (DM) as a % of Sales</b> (Direct material from above / Total value of shipments from ASM)	$= 6,929,981 / 11,610,268$ $= \mathbf{59.7\%}$
<b>Calculate Manufacturing Overhead (MOH) %</b> {COGS – (Direct Material + Direct Labor)}	$= 82.3\% - (59.7\% + 8.7\%)$ $= \mathbf{13.9\%}$

## Build an Industry Cost Profile

Industry Cost Profile:

**Iron and Steel Pipe and Tube Manufacturing from Purchased Steel**

Element	%
Direct Material	59.7%
Direct Labor	8.7%
Manufacturing Overhead	13.9%
<b>Cost of Goods Sold</b>	<b>82.3%</b>
GSA & Other Expenses	14.5%
Profit Before Tax	3.2%
<b>PRICE</b>	<b>100%</b>

## Monetize one cost element (e.g. Direct Material)

Break down the Bill of Materials (BOM)	? tonnes of steel per section (type of steel)
Obtain quotes on BOM elements	?\$ per tonne
Calculate Direct Material costs	= \$/tonne * # tonnes/section = \$/section

Element	%	\$	Calculation
Direct Material	59.7%		= ?\$/tonne * ? tonnes/section
Direct Labor	8.7%		
Manufacturing Overhead	13.9%		
<i>Cost of Goods Sold</i>	82.3%		
GSA & Other Expenses	14.5%		
Profit Before Tax	3.2%		
<b>PRICE</b>	<b>100%</b>		

## Monetize one cost element (e.g. Direct Material)

Break down the Bill of Materials (BOM)	2.8 tonnes of steel per section (cold rolled coil)
Obtain quotes on BOM elements (Source: www.meps.co.uk)	\$1,584.5 / tonne
Calculate Direct Material costs	= \$1,584.5 per tonne * 2.8 tonnes per section = <b>\$4,437 per section</b>

Month	Hot Rolled Coil	Hot Rolled Plate	Cold Rolled Coil	Hot Dipped Galvanised Coil	Electro Zinc Coated Coil	Wire Rod	Sections & Beams	Rebar	Merchant Bar
Oct-2020	752	669	893	1007	1038	650	790	643	760
Nov-2020	823	713	965	1073	1093	672	794	643	764
Dec-2020	994	835	1114	1223	1248	705	825	677	798
Jan-2021	1215	1038	1315	1420	1446	838	988	810	911
Feb-2021	1310	1125	1465	1568	1601	904	1043	855	959
Mar-2021	1433	1210	1594	1709	1733	937	1094	886	990
Apr-2021	1530	1260	1693	1808	1821	937	1095	889	991
May-2021	1706	1354	1851	1967	1975	970	1200	935	1086
Jun-2021	1884	1480	2051	2177	2185	1047	1310	992	1163
Jul-2021	2006	1561	2177	2302	2317	1102	1378	1060	1208
Aug-2021	2115	1725	2312	2428	2438	1146	1427	1065	1262

**11-month average Cold Rolled Coil:**  
**\$1584.5/ tonne**

Source: <http://www.meps.co.uk>

## Monetize one cost element and Estimate Should Cost

Break down the Bill of Materials (BOM)	2.8 tonnes of steel per section (cold rolled coil)
Obtain quotes on BOM elements	\$1,584.5/ tonne
Calculate Direct Material costs	= \$1,584.5 per tonne * 2.8 tonnes per section = <b>\$4,437 per section</b>
Calculate Should Cost (Direct Material Cost (\$) / Direct Material %)	= \$4,437 / 0.597 = <b>\$7,432</b>

Element	%	\$	Calculations
Direct Material	59.7%	\$4,437	= \$1,584.5 / tonne * 2.8 tonnes / section
Direct Labor	8.7%		
Manufacturing Overhead	13.9%		
Cost of Goods Sold	82.3%		
GSA & Other Expenses	14.5%		
Profit Before Tax	3.2%		
<b>PRICE</b>	<b>100%</b>	<b>\$7,432</b>	<b>= \$4,437 / 0.597</b>

## Use Industry Cost Profile to estimate the other cost elements

Element	%	\$	Calculations
Direct Material	59.7%	\$4,437	= \$1,584.5.5 / tonne * 2.8 tonnes / section
Direct Labor	8.7%	\$647	= \$7,432 * 0.087
Manufacturing Overhead	13.9%	\$1,033	= \$7,432 * 0.139
Cost of Goods Sold	82.3%	\$6,117	= \$7,432 * 0.823
GSA & Other Expenses	14.5%	\$1,078	= \$7,432 * 0.145
Profit Before Tax	3.2%	\$238	= \$7,432 * 0.032
<b>PRICE</b>	<b>100%</b>	<b>\$7,432</b>	<b>= \$ 4,437 / 0.597</b>

## Should cost model: Line Pipe

NAICS CODE 331210:

Iron and Steel Pipe and Tube Manufacturing from Purchased Steel

Element	%	\$	Source
Direct Material	59.7%	\$4,437	Economic Census-ASM, BOM & MEPS Int'l
Direct Labor	8.7%	\$647	Economic Census-ASM
Manufacturing Overhead	13.9%	\$1,033	COGS – (DM + DL)
<i>Cost of Goods Sold</i>	82.3%	<i>\$6,117</i>	Suppliers Financial Statements
GSA & Other Expenses	14.5%	<i>\$1,078</i>	Suppliers Financial Statements
Profit Before Taxes	3.2%	<i>\$238</i>	Suppliers Financial Statements
<b>SHOULD COST</b>	<b>100%</b>	<b>\$7,432</b>	<b>Direct Material \$ / DM %</b>

**Supplier Proposal = \$8,500 Potential savings ~14.4%**