



WORLD EVENT
2010

**Save a boatload of
cash with classification**

Lewis Lawrence



Weatherford

2010



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Event hashtag is #PTCUSER10

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Introduction

What I intend to show you today

- Why Weatherford started a data classification project
- How the project began
- How the classification project evolved and permeated the rest of the business
- How Weatherford has developed its use of classification and attribute data to great benefit
- How we plan to use it in the future (maybe!)
- From our examples you will understand how data classification may benefit your business

Lewis Lawrence

- Lives in Aberdeen in Scotland, but travels a bit for work.
- Manages a team of seven, with members located in: Edmonton Canada, Houston Texas, Aberdeen Scotland, Dubai UAE, Shanghai China.
- Process Owner for Windchill with IT at Weatherford International. This makes him responsible for all aspects of Weatherford's Windchill system.
 - This includes: Support, Training, Installation, Deployment and Development.
- Weatherford has 1,800 active Windchill users located globally.

How Much Is A Boatload Of Cash?

Depends on the boat and the cash.....

- \$500.00 in quarters weighs around 30 Lbs
- Boats come in a variety of sizes.



Weatherford (WFT)

Who we are, and what we do

- One of the largest global providers, Weatherford helps build innovative mechanical solutions, technology applications, and services for all phases of oil and gas developments. Weatherford operates in over 100 countries and employs more than 40,000 people worldwide. <http://www.weatherford.com>
- Around \$8.8 Billion Revenue
- Traded as WFT on the New York Stock Exchange.
- Many products are designed/customised or configured to order, have limited production, but an infinite lifecycle.

Weatherford Locations

North America
Service Locations 420
Manufacturing Facilities 56
Employees 25%

Latin America
Service Locations 121
Manufacturing Facilities 14
Employees 18%

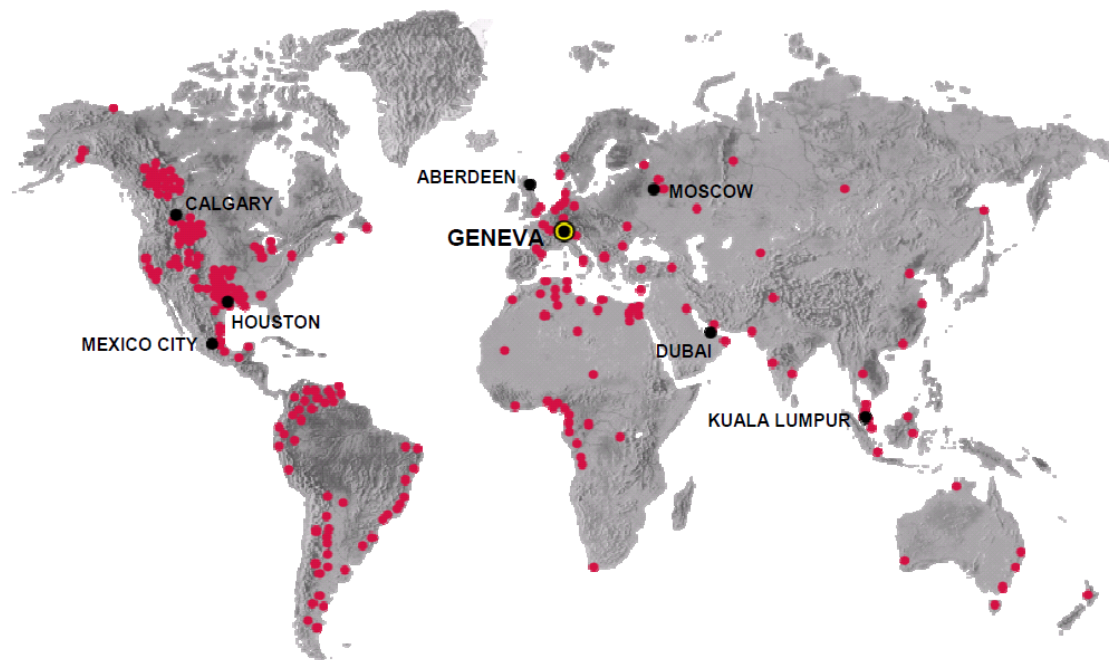
Europe / W Africa
Service Locations 185
Manufacturing Facilities 21
Employees 29%

Middle East / North Africa
Service Locations 99
Manufacturing Facilities 5
Employees 19%

Asia
Service Locations 79
Manufacturing Facilities 10
Employees 8%

International
484 Service Locations
50 Manufacturing Facilities

Additions 2008-2009
17 Service Locations
3 R&D Facilities
5 Training Facilities



- Weatherford locations
- Regional offices
- Corporate headquarters

Weatherford Is A Growth Company

Over 170 Acquisitions (And Counting)

- Weatherford has grown mostly by acquisition
- A challenge with acquisitions is integration
- At Weatherford we integrate acquisitions as quickly as we can, allowing the acquired firms products and services to be leveraged by the Weatherford supply chain, customer base and Sales and Marketing groups.
- Weatherford is Weatherford's biggest customer:
 - Most sales from our plants are internal sales to our services organisation or “operations”.
 - An inventory item is transferred into an asset.

Why Weatherford Is Weatherford's Biggest Customer. Internal Sales

Manufacturing mostly provides for services

- A Manufacturing Plant Makes a part/assembly
- It is sold internally to a service location
- As it is received the service location turns the inventory into a serialised asset. Customers are charged for the use of the equipment as part of a service contract.



Rental Part Number Example

Showing Serialized Asset Availability



Item Information		
	Item Number:	236372
	Description:	Tong, rotary c
	3rd Item Number:	TNG11001130
	Version:	A
	Price Book Reference:	Rockies
	Life Cycle State:	Released

[Serial Excel Export](#)

Serial Number	Serial Description	Branch Plant Number	Branch Plant Name	Quantity On Hand	Quantity Available	Rented	Repair	Inspection	Not Found	Sold	Committed	Country	State
1396361		35406	EDI-US-LA-BROUSSARD-DIST#4180	1	1	0	0	0	0	0	0	UNITED STATES	Louisiana
143605	(MPI-OK 4-12-07)	10220	EDI-US-TX-LAREDO-FISHING/RENTA	1	0	1	0	0	0	0	0	UNITED STATES	Texas
1618	SHOP TONG	78276	EDI-US-LA-BROUSSARD-RENTAL E10	1	1	0	0	0	0	0	0	UNITED STATES	Louisiana
1629	SHOP TONG	78276	EDI-US-LA-BROUSSARD-RENTAL E10	1	1	0	0	0	0	0	0	UNITED STATES	Louisiana
171404	BJ	11505	E-VE-VEW-ANACO-DZZ-D-LA-VE	1	1	0	0	0	0	0	0	VENEZUELA	ANZOATEGI
171405	BJ	11505	E-VE-VEW-ANACO-DZZ-D-LA-VE	1	1	0	0	0	0	0	0	VENEZUELA	ANZOATEGI
17459		10190	EDI-US-LA-LAKE CHARLES-F/R-WEL	1	1	0	0	0	0	0	0	UNITED STATES	Louisiana
198042	SHORT LEVER	10198	EDI-US-NM-FARMINGTON-F/R/WIRE	1	1	0	0	0	0	0	0	UNITED STATES	New Mexico
2111	SHORT LEVER	35407	EDI-US-WY-CASPER-DIST #4180	1	1	0	0	0	0	0	0	UNITED STATES	Wyoming
22	LESS LUG JAW	10220	EDI-US-TX-LAREDO-FISHING/RENTA	1	1	0	0	0	0	0	0	UNITED STATES	Texas

Windchill At Weatherford

Windchill is mission critical for us

- Windchill is the front end to our ERP system JD Edwards
 - All parts/items in ERP must be created in Windchill
 - They go through an automatic interface
 - All parts must be classified before they will go through the interface
 - All manufacturing information is accessed from Windchill
 - Windchill down = Enterprise down
 - And Lewis's bum is in a sling.....

Windchill and ERP At Weatherford

You think you have problems.....

- Since 2002 Weatherford has been steadily deploying our ERP system JD Edwards throughout the organisation.
- Currently 85% of our business is conducted using JD Edwards (~\$7.5 Billion).
- There have been over 30 major go lives for different regions/locations/plants.
- The go-lives are concurrent for Windchill and JDE.
- Shut-down in Legacy on Friday, start-up in Windchill/JDE the following Monday (sounds easy doesn't it).
 - This is extremely non-trivial

Windchill At Weatherford

We “love” our data, it keeps us in business

- Currently in our production Windchill system we have:
 - 1,800 Active Users (logged on in past 60 days)
 - 850,000 Released part numbers (all classified)
 - 920,000 Windchill part numbers
 - 1,049,000 Legacy numbers (secondary numbers)
- On a per month basis our users produce
 - 5000 new parts are released (all classified)
 - 1500 part revisions
 - 1000 change requests

Data Management Fundamentals

Things everyone with a data management system must know!

- The information a data management system contains is what gives it value.
 - Without data, the system is worthless.
 - Without a system, data is worthless (nobody can use it).
- Bad data is worse than no data.
- Inconsistent data is bad data.
- The system does not create data (need users).
- The system cannot fix data.
- **Good data is priceless.**

What Is Classification?

The act of distributing things into classes or categories of the same type

- Goals of classification
 - Group by similarities
 - Most generic → → → Most specific
 - Category → Subcategory → Terminal node
 - Attributes
 - Attribute values

Classification Example

Beverages

Spirits

Whisky

Single Malt

Age: 18 Years

Distillery: Highland Park

Score Out Of Ten: 10



Classification At Weatherford

- Weatherford's classification initiative started out with the usual goals:
 - Allow search and retrieval for component re-use.
 - Allow advanced search of Weatherford products, supporting internal sales and catalogues.
 - Get to One Item Number for each physical part/asset:
 - Reducing part count.
 - Better Inventory management.
 - **Better Asset management.**

Classification At Weatherford

Classification is a function of PDM and ERP go-live

- An additional goal for Weatherford was defining a rolling Conversion Process/Strategy. For bringing locations onto PDM and ERP. Initially used for the many plants that needed brought on to the systems.
 - This is a process that begins with part classification
 - Flows through Part Mapping
 - Followed by Data Conversion and Validation
 - Ending with a Go-Live
- The process for this has been refined through the years, and is still in use to integrate acquisitions.

Classification Is Now Required At Weatherford

The business processes we use require it

- At first (2002/2003) classification data was seen by most Engineering users as something “extra” that “the man” was forcing the working people to do, and it was only barely used for search and retrieval.
 - It was not given much regard by Engineering.
- However, as good data started becoming available the information proved useful in a variety of areas.
 - It proved particularly useful to operations and finance, who pay Engineering’s wages.....

Classification Is Becoming More Common For Other Businesses Too

Necessity is the mother of invention

- Most companies historically had information in various silos throughout the organisation.
- Many companies deployed PDM as a “single source of truth” under the mistaken impression that having all their data managed in one system would make it easy to find and report on.
 - They then typically spent a lot of time trying to index their data to make it easy to find and report on.
- **There is no magic bullet**

How You Can Save A Boatload Of Cash! Everything You Need On One Slide!

I didn't say any of this was easy

1. Define a classification taxonomy for all your parts that meets all business needs.
2. Classify all your parts and populate attributes.
3. Force classification on all new parts by subject matter experts as a function of new part creation.
4. Identify and consolidate duplicate parts.
5. Make the classification and attribute data easily available throughout the organization.
6. Utilise the classification and attribute data in any business process and decisions where it can add value.

Defining Classification

Classifying Data & Migrating To Windchill

I have covered these in the past.

- I have presented on these topics in previous years and they are big topics that I don't have time to cover today.
- My previous presentation content is still relevant and if it is not available for download please contact me and I will send you a copy (a bribe of some sort would be appreciated).
 - 2006 Reducing Costs With Windchill Classification
 - 2007 Demystifying Classification & Re-Use
 - 2007 Making Legacy Systems Extinct

“I am easily satisfied with the very best. ”

*– Winston Churchill
Prime Minister UK.*

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Weatherford's Classification

Some statistics

- Our classification structure:
 - 5500 nodes, 2000 terminal (where parts are classified)
 - Max 7 levels deep
 - Average 3.66 levels deep
 - Average number of attributes per node is 9.7
 - Max is 70.
- The most populated node has 31,000 parts.
- All our parts are classified (850,000).
- Our data is of mixed quality and is by no means perfect.

“The best argument against democracy is a five-minute conversation with the average voter. “

*– Winston Churchill
Prime Minister UK.*

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Identify And Consolidate Duplicate Parts

Identification is easy, part displacement is not.

- Good classification and attribute data combined with query tools make it easier to identify duplicates.
 - In most companies it is possible to identify duplicate parts anyway, even without the new tools and data.
- Consolidating Duplicate parts is difficult, few tools exist.
 - Update BOM's.
 - Moving Inventory to new part number.
 - Prevent transactions on the old number.
 - Update CAD structures
 - *Update Documentation

Consolidating Duplicates At Migration Time Weatherford Calls It “Part Mapping”

Huge reduction in part number count

- During our conversion process, the classification team engages with subject matter experts to analyze the data.
- They may find existing equivalent parts in the system.
 - The subject matter experts agree on the equivalence.
 - The parts are “mapped” at conversion time.
 - The existing part is used in BOMs, and is used to represent any inventory.
 - The existing part number is added as a manufacturer part linked to the existing OEM part.
 - The docs don't need updated

Consolidating Duplicate Parts 920k Windchill part numbers. 1049k AML

Over 12% reduction in Weatherfords part count

Bill of Materials Report for Part: 00577913, A (Design)

Part	Name	Quantity	Line Number	PDF	Legacy Number	Primary/Secondary	State
00577913, A (Design)	Collar, float 3-1/2 402HL 13Cr 95 LI NK3SB blank 12.95			Create PDF	402HL31BNK31C90129	Primary	Released
00769223, A (Design)	O-ring -222 WE402 (FKM 90 standard) SAE AS568	1.0 each	10	No Described By Documents	769223	Primary	Released
					N60006-222	Secondary	
					050-V9-222	Secondary	
					1403V222	Secondary	
					491-222-00-9	Secondary	
					61103-222	Secondary	
					OV-222-090	Secondary	
					164-590-1010V	Secondary	
					164-854-0222V	Secondary	
					002085-LWD	Secondary	
					L-AA-002085	Secondary	
					015-5690-222	Secondary	
					842222-190	Secondary	
					V1411 2-222	Secondary	
					L-AB-002085	Secondary	
					000-V569-222	Secondary	
					842222190	Secondary	
					4305046	Secondary	
					97640	Secondary	
					LAA002085	Secondary	
					3011995	Secondary	
00576235, A (Design)	Seat, blank 2-7/8 - 3-1/2 SS3 AL (aluminium) 6061	1.0 each	30	00576235_Part_A.pdf	365-610-2000	Primary	Released

Utilising Classification Data

Show me the money!

- The previous slides just showed typical uses of classification data.
 - Lots of companies do this, and there is nothing particularly unique or innovative about it.
- The following slides show more diverse uses.
- Why has Weatherford done this?
 - Because we can.

“However beautiful the strategy, you should occasionally look at the results.”

*– Winston Churchill
Prime Minister UK.*

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Cash Savings Classification As Capitalised Expense

Data classification is Intellectual Property

- Anything that is being created “new” in support of your business can potentially be a capitalised expense.
- So the time, effort and costs invested in your data classification can be capitalised.
- There are tax advantages to this I don't fully understand.
- I have no idea how much savings this can provide.

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Making Classification Data Available

Linking Classification and Business data

- Weatherford makes its classification data available to the ERP system, to link technical data directly to business data in queries using the ERP reporting tools.
 - So Technical Attributes can be used in queries along with business attributes.
 - E.G. Show me all the Parts where: classified as Round Bar with, a material spec of SS301, a diameter between 5 and 6 inches, inventory on hand at a plant in North America where the cost is > \$60/inch.
- This allows very neat and granular segregation of data for business analysis.

Example Query Results

Technical And Business Data Combined


















Search for Items Help
 Search for in All Descriptions >>Search
☒ Search All ☐ Search Within Results
Use an asterisk (*) as a wildcard for unknown information.




Browse by ...
 Classification
 Rentals
 Pressure control
 Blowout preventors

Your choices so far:
 ☒ Classification > Rentals > Pressure control > Blowout preventors
 ☒ Branch Plant Country > CANADA
 ☒ WORKING PRESSURE > 15000

Displaying 1 - 5 of 5 Select Records Per Page: 10

	Compare	Item Number ▲	Description	3rd Item Number
  	<input type="checkbox"/>	237594	Bop, ram type 11 15000 SNGL HYD TY U	BOP11152110
  	<input type="checkbox"/>	237718	Bop, ram type 11 15000 DBL HYD TY U	BOP11152210
  	<input type="checkbox"/>	297227	Bop, ram type 7-1/16 15000 SNGL HYD	BOP07152120
  	<input type="checkbox"/>	297355	Bop, ram type 4-1/16 15000 SNGL HYD	BOP04152140
  	<input type="checkbox"/>	297357	Bop, ram type 7-1/16 15000 DBL HYD	BOP07152220

[Search Results Excel Export](#)

 = view item detail
  = locate part
  = locate serial
 Item Numbers in RED: Quantity On Hand = 0

New View Go Back

Serial Attributes
 COMMENTS
 MANUFACTURER NAME
 BOWEN
 CAMERON IRON WORKS
 SHAFFER
 STEW STEV
 MANUFACTURER SERIAL NUMBER
 MATERIAL CLASS
 MEMO LOT 3
 ORIGINAL PART NUMBER DESCRIPTION
 OUTLET CONFIGURATION
 OVERALL HEIGHT
 OWNERSHIP
 PRESSURE RATING
 QUALITY LEVEL
 RUN FACE A GASKET PROFILE
 RUN FACE A TYPE
 RUN FACE B GASKET PROFILE
 SER WEIGHT
 SERIAL DESCRIPTION
 SERIAL DESCRIPTION, LEGACY

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Enterprise Classification Search

Lots of easy ways to find stuff, whoever you are.

- Having all your information easily “brows-able” has massive value.
 - Few users could access known good data before.
 - Just the classification alone adds value.
 - Linking from serial items to inventory items is huge!
- Part identification is no longer limited to description and part number.
 - To uniquely identify/differentiate some of our equipment takes more than 40 attributes per part.
 - Descriptions/names are always a limitation.

Cash Savings Classification Drives General Ledger

Consistent reporting, less errors and finance staff.

- General Ledger sometimes known as the nominal ledger, is the main accounting record of a business.
 - The general ledger is the core of a companies financial records, these constitute the central books of the system.
- One finance team maintains a map table that relates the Classification to the correct General Ledger code.
 - The Windchill classification sets the general ledger for all items in ERP. Classification = GL Code.
 - **Changes can be immediately and accurately applied**

Cash Savings

Classification “Controls” Permissions

You need to be authorised to use certain nodes

- As the Classification is driving the GL-Code, and therefore inventory and revenue recognition.
- Only sanctioned users are allowed to use the nodes relevant to their area of expertise.
 - More importantly only sanctioned users can complete the workflow tasks to promote parts in Windchill.
 - Promoting a part automatically releases it to ERP.
 - This means (In theory at least) that only high quality data, created and promoted by subject matter experts is released for transaction.

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Attribute Driven Processes

Drawing re-use, de-skill part creation and updates

- The traditional drawing information like “Material Specification” has been moved from the drawing border to a part attribute.
- So geometrically identical parts can all be described by the same drawing.
- Creation of a new/repeat part from a different material is a clerical function, and does not require a license of CAD.
- [Drawing Example PDF](#)

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Procurement Efficiencies


Buying the right stuff is difficult with a lot of data


- Procurement requirement definitions are done using attributes and classification, with certain key attributes being required on the relevant classification nodes.
 - This removes any uncertainty as to exactly what the physical part is.
 - A 60 Character description is seldom enough to fully and uniquely describe a part.

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Cash Savings Procurement Efficiencies

Parts are accurately defined using attributes

**Weatherford**

 **Properties of Part 01375149, A (Design)**

Number:	01375149	Part Number Legacy:	1375149
Name:	Bar, round 6.500 OD BRZ 630 SRL HF WN126	Part Type:	Part
Source:	Buy		

Attributes:


Classification	Weatherford/Raw materials/Bar and rod/Round
CONDITION	stress relieved
FINISH	hot finished
GENERIC DESCRIPTION (NODE SUB-GROUP)	Bar, round
MATERIAL	bronze
MATERIAL GRADE	bronze 630
MATERIAL SPECIFICATION	WN126
MATERIAL YIELD STRENGTH	45.0 kpsi
OUTSIDE DIAMETER	6.500 in
WEIGHT PER FOOT	112.808 lbs-mass/ft

Described by PDF Document Representation:

No PDF

Describing Documents:

This part does not have described by documents

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Outsourcing Decisions

Which vendor is suitable for which parts?

- Weatherford has over 75,000 suppliers.
 - How does someone in procurement know who should quote on a particular order?
 - What if we gain a supplier, how do we link their suitability to parts required for an order?
- Vendors are “suggested” using classification and previous order history.
- Based on classification it is also possible to roughly gauge “part complexity” and make educated guesses about vendor suitability.

Vendors select classification and attributes to show suitability

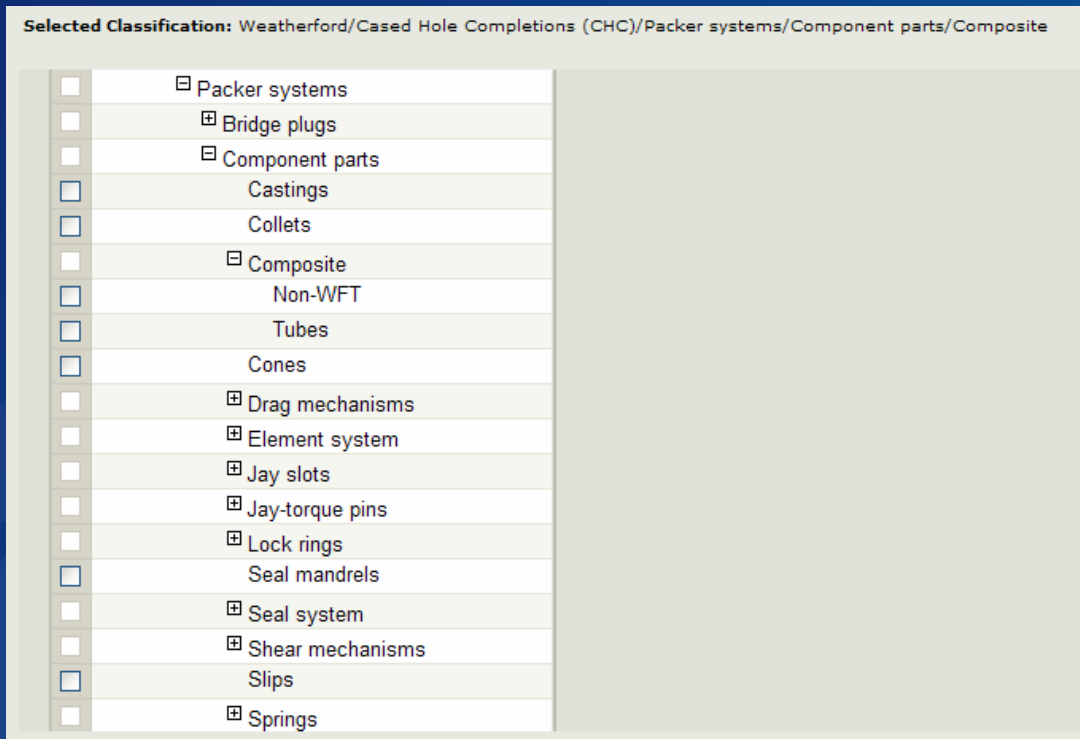
BAR [255]

- ☒ ANGLE
- ☒ BORED
- ☒ COUNTERBORED
- ☒ DRILLED
 - ☒ **ALLOY STEEL**
 - ☒ **4130**
 - ☒ **4130-45**
 - ☒ **4140**
 - ☒ **4140-45**
 - ☒ **4145**
 - ☒ **414X-4340**
 - ☒ **4330**
 - ☒ **4330-40**
 - ☒ **4340**
 - ☒ **8620**
 - ☒ **9 CHROME**
 - ☒ **P110**
 - ☐ ALUMINUM (ALUMINIUM)
 - ☐ BRONZE
 - ☐ CARBON STEEL
 - ☐ DUPLEX STAINLESS
 - ☐ NICKEL ALLOY
 - ☐ STAINLESS STEEL
 - ☐ STEEL
- ☒ FLAT
- ☒ HEX
- ☒ ROUND
- ☒ SQUARE

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Procurement Efficiencies

- Parts with similar geometry are on the same node, so to analyse a product lines data for outsourcing suitability only requires looking at CAD data for one part on each node.



Cash Savings

Weatherford Customer Service Efficiencies

Knowing what to provide to the customer is tricky

- Obviously enterprise search using classification and attributes is very useful for customer services.
 - Weatherford also customized something we call Companion Parts.
 - Companion Parts are things like accessories or service kits that belong/work with an assembly.
 - A Windchill managed object linking parts.
- Seeding of this new data object was done using classification and attributes.
 - Connection Up – Connection Down etc.

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Weatherford Customer Service Efficiencies


Companion Parts Example

Companion Parts of Part: 00320946 Lock, mandrel... ?

Companion Parts: (4 total objects)

<u>Number</u>	<u>Name</u>	<u>Type</u>
00176943	Tool, running 5.000 QX 4140 1.875 QLS male	Accessory
00176501	Handle, pinning 4.000 QX 4145 F/3.688" to 4.500" QX Locks	Workshop
00176949	Probe, pulling, PWS, 5.000in, 0.625in bull plug none	Accessory
00329861	Lock, mandrel 4.000 QX 17-4PH no seal 3.375 UN pin	Accessory

EditClose

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Choosing Parts For Company Spin Off

Data identification was easy

- Weatherford sold a portion of it's business
- The new owner of that data needed their data.
- The parts, documents and CAD data were easy to identify.
- The exact value of that portion of the business could also be accurately determined.
 - Inventory values were known.
 - Revenue was known.

Harmonized Tariff System (HTS) Codes


Weatherford Compliance Toolset

These are important, non compliance is a crime

- HTS codes are a requirement for export.
- Each product traded across international borders falls into a 6, 8 or even 10-digit HTS category.
- Based on the nature of the product and certain physical characteristics a code will apply.
- Maintaining HTS codes is hard for most companies
- Maintaining them with a million parts is harder.
- Weatherford have developed a rules engine to help accurately determine the code using classification and attribute data as input.

Harmonized Tariff System (HTS) Codes Weatherford Compliance Toolset

Rules engine example




 **Weatherford HTS Classification**

Jobs Run HTS Codes Tests Administration Help








HTS Tests

HTS Code:

Parts will be tested from the Classifications below. Classifications are also used to determine attribute choices.

	Classification	Parts	Status
			
	 Raw materials/Tube and pipe/Casing	532	Errors (498)

Tests to Perform on Parts

	Number	Attribute	Comparison	Criteria	Modified Date	ModifiedBy
	1	GENERIC DESCRIPTION (NODE SUB-GROUP)	Equals	Casing	19-Apr-2010	drokebg
	2	OUTSIDE DIAMETER	<	215.9	16-Apr-2010	drokebg
	3	MATERIAL	Equals	stainless steel	20-Apr-2010	drokebg
	4	MATERIAL SPECIFICATION	Contains	SS301 SS304 SS305 SS306	20-Apr-2010	drokebg
	6	CONNECTION TYPE	Contains	plain-end none	19-Apr-2010	drokebg
	7	PROCESS	Equals	Seamless	20-Apr-2010	drokebg
	8					

☒ Add Records [Export](#) (6)



Future Things

Things we really want to do next

- Re-use attribute values directly into technical and marketing documentation to create those automatically using standard templates.
 - Typically all the key data used in the tech manual is directly available as a classification attribute
 - Some of the dimensional attribute data can be mapped directly from Pro E.
 - This has tremendous potential when you consider Engineering changes
- Databook Example

Future Things

Attribute data for assembly shown in the example databook

Classification Attributes (16 total objects) ?	
  Check Out and Edit Find in List	
Name	Value
^ BRAND NAME	SMS
CONNECTION DOWN NAME	UN
CONNECTION DOWN PITCH	12
CONNECTION DOWN SIZE	2.125 in
CONNECTION DOWN TYPE	box
CONNECTION UP NAME	QLS
CONNECTION UP PITCH	0
CONNECTION UP SIZE	1.875 in
CONNECTION UP TYPE	male
▼ Classification	Standard Pulling Tools

Summary

This all used to be fantasy for Weatherford.

- Initially we tried to do this we had a lot of push back from Engineering.
- Now Engineering ensure the data is good because they know that it is driving our business.
 - It is no different than maintaining revision information.
- Other companies will be doing this in the future.
 - It just makes good sense.

“Continuous effort - not strength or intelligence - is the key to unlocking our potential.”

“Difficulties mastered are opportunities won.”

– Winston Churchill
Prime Minister UK.

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Contact Info

- Best approach method;
 - “Lewis, loved your presentation, can I buy you a drink and ask you a few questions please?”
- Failing that, you might try email;
 - lewis.lawrence@weatherford.com
(I get a lot of email and am much more likely to ignore this approach)



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