

Summary of Findings – Fasteners DVA

About 2000 imperial screws were evaluated to determine cost benefits of having better data and a system to both cleanse and maintain this data. Once the data was cleansed and analyzed using CDS's DFR data tools – significant cost saving opportunities were identified including:

- 25% identified as potential duplicates – or candidates for rationalization
- 50% identified as a potential near duplicate – or candidates for substitution or re-use

Summary of potential benefits:

- \$151k Annual Savings due to eliminating 20% new part requests
- \$300k Annual Savings from pricing rationalization from top cluster groupings – 200 screws
- \$180k Annual Savings – mitigating 1/3 of the spot buys by using existing inventory

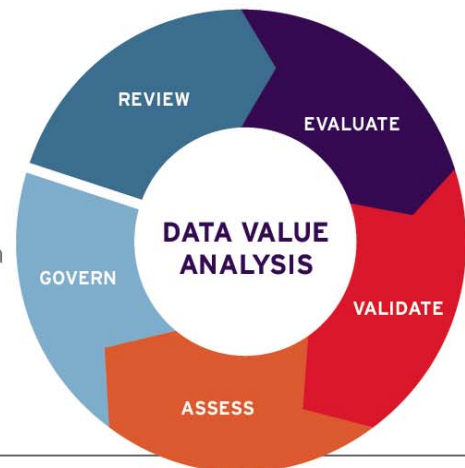
DVA Background – Data Value Analysis by Convergence Data Services

Convergence Data Services (CDS) is a parts data management software company servicing various industries the past 15 years. The DVA is a quick process to analyze a company's data, classify and cleanse the data to estimate the potential value the data could have.

KEY COMPONENTS OF A DATA VALUE ANALYSIS

After evaluating your product data, we will generate your customized report. This easy-to-review report includes a/an:

- Review of data format and completeness
- Evaluation of data taxonomy
- Validation of data, including value inconsistencies, description formats, nulls, mixed-value types and data with appropriate ranges
- Assessment of the ease of searching, comparing, sorting and analyzing data
- Review of the data governance process



Initial Data Assessment – Prior to Data Cleansing

After loading and modeling the fastener data into DFR, several diagnostic data quality checks were executed to determine the data cleansing necessary to produce effective analytical reports.

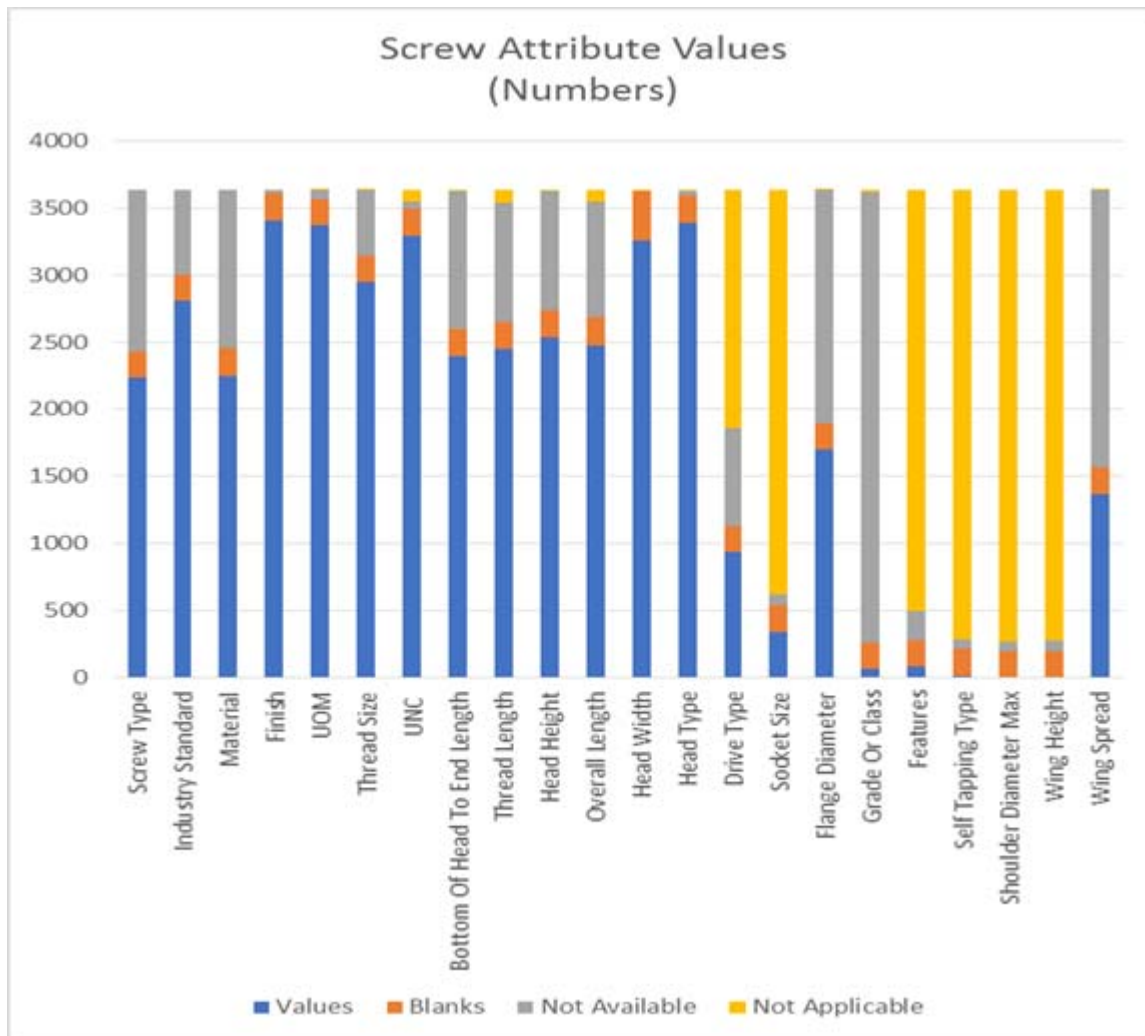


Figure 1 Initial Screw Attribute Data Analysis

Data Trend Analysis – post data cleansing

Once the screw data was cleansed and normalized in DFR several trends in the data could be analyzed. These trends can serve as an input into standardizing on features to help manage costs and inventory by having less one-off screw configurations.

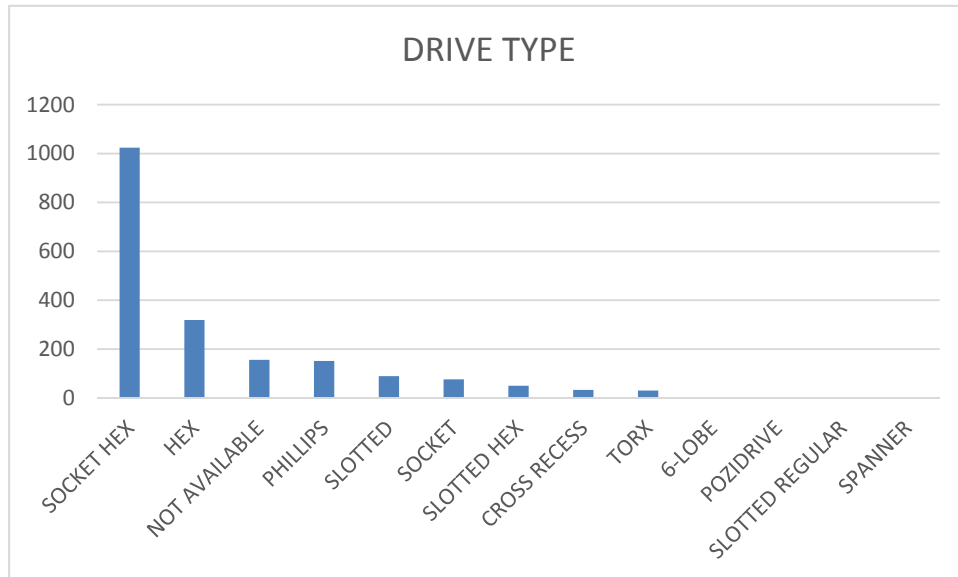


Figure 2 Attribute Drive Type Value Count

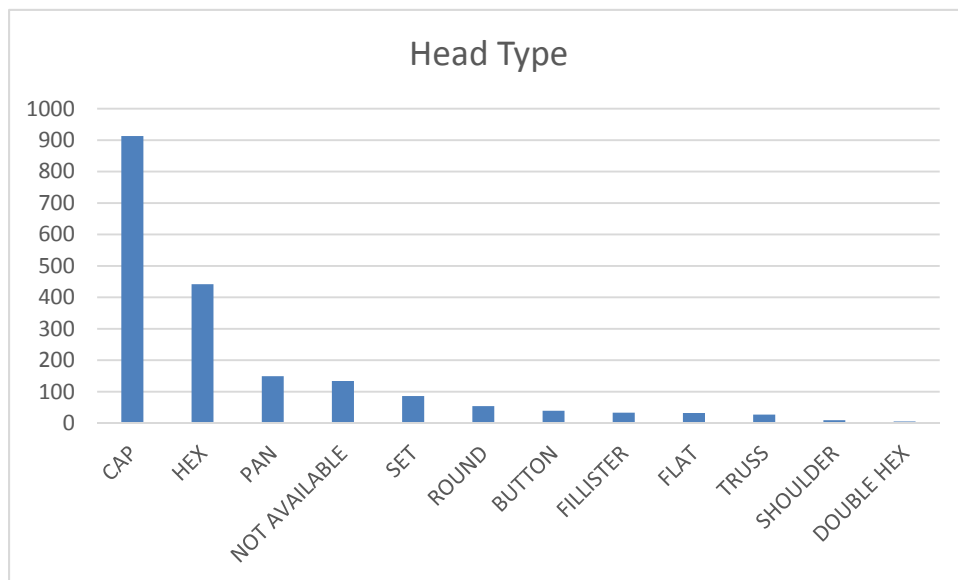


Figure 3 Attributes Head Type Value Counts

Duplicates and Near Duplicates Analysis – DFR Analytics

Using Convergence's Duplicate Finder analytical tool for identifying duplicates and near duplicates the following analysis was produced.

- 35% of screws had the same critical attribute values – identified as potential duplicates

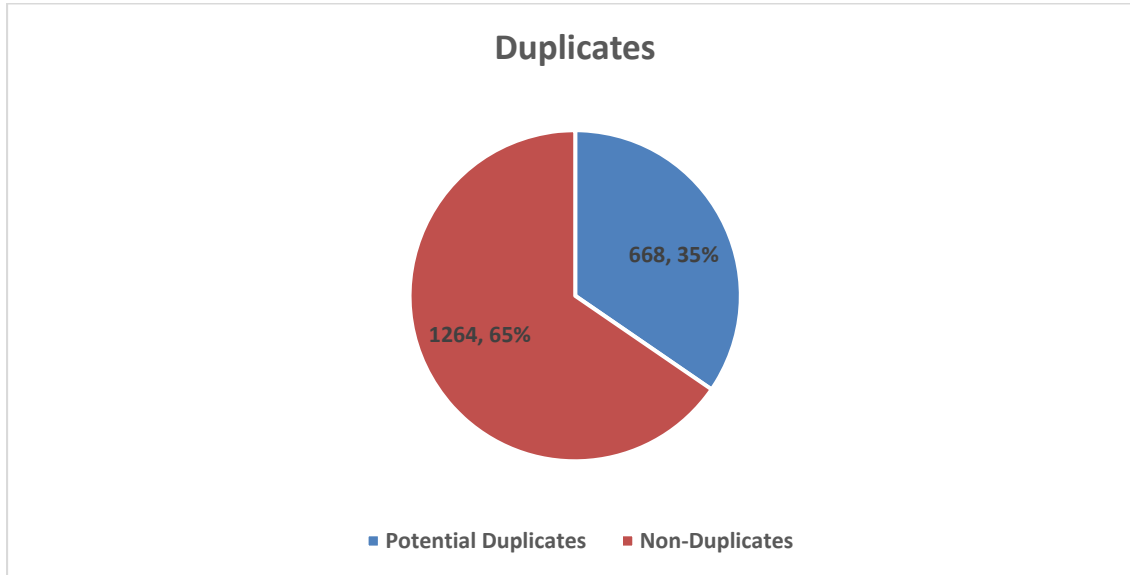


Figure 4 DFR Duplicate Finder Results for Screws

	# OF DUPs	HEAD TYPE	DRIVE TYPE	MATERIAL	THREA D SIZE	THREAD DIAMETER	PITCH	LENGTH
1	8	CAP	SOCKET HEX	STEEL	3/8	0.3750	16	1.50
2	6	CAP	SOCKET HEX	STEEL	3/8	0.3750	16	1.75
3	6	CAP	SOCKET HEX	CARBON STEEL	3/8	0.3750	16	1.25
4	6	CAP	SOCKET HEX	CARBON STEEL	3/8	0.3750	16	1.00
5	6	CAP	SOCKET HEX	STEEL	3/8	0.3750	16	1.00
6	6	CAP	SOCKET HEX	ALLOY STEEL	1/4	0.2500	20	1.25
7	5	CAP	SOCKET HEX	NOT AVAILABLE	5/8	0.6250	16	1.00
8	5	CAP	SOCKET HEX	CARBON STEEL	5/8	0.6250	11	3.00
9	5	CAP	SOCKET HEX	ALLOY STEEL	1/2	0.5000	20	1.00
10	5	CAP	SOCKET HEX	CARBON STEEL	1/2	0.5000	13	1.25

Figure 5 DFR Duplicate Report Top 10 Results for Screws

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Near duplicates were identified using Convergence's cluster analysis tool producing the following results:

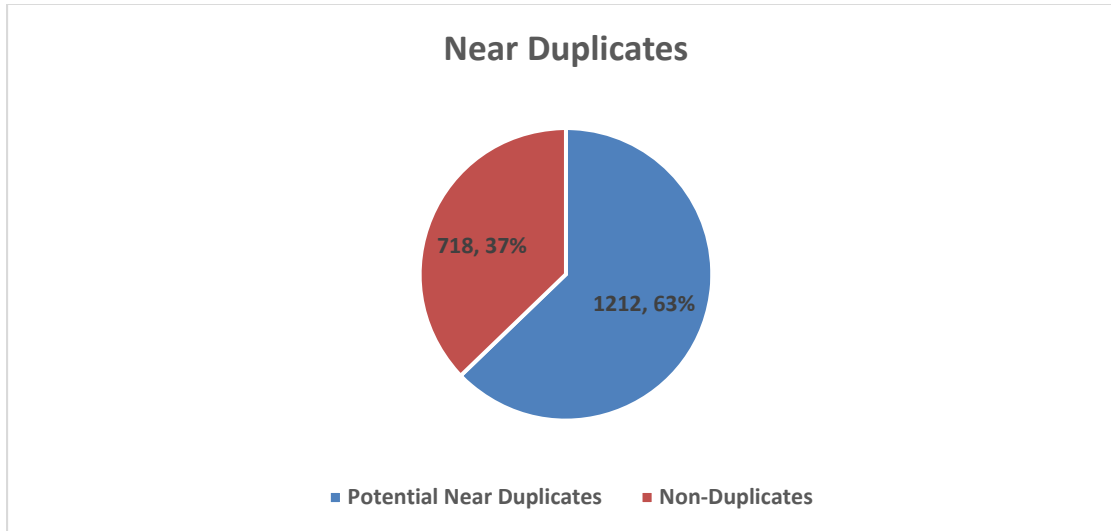


Figure 6 DFR Clusters Tool Near Duplicates Results for Screws

Top 10 Near Duplicate Clusters – Neighbors indicate the size of the groupings. The first cluster has 25 very similar screws in its cluster sharing the same attribute data as displayed in the table below.

Cluster#	Neighbors	Drive Type	Head Type	Length	Material	THD Size	Pitch
1	25	Socket Hex	cap	1	steel	1/4	20
2	24	Socket Hex	cap	1	steel	3/8	16
3	17	Socket Hex	cap	1.5	steel	3/8	16
4	15	Socket Hex	cap	1	steel	5/16	18
5	14	Socket Hex	cap	0.5	steel	1/4	20
6	13	Hex	Hex	0.5	steel	1/4	20
7	11	Socket Hex	cap	2	steel	1/2	13
8	10	Hex	Hex	0.5	steel	#10	16
9	9	Socket Hex	cap	3.5	steel	1/2	13
10	8	slotted hex	hex	0.63	steel	1/4	20

Figure 7 DFR Clusters Tool Near Duplicates Results – Top 10 Screw Clusters

Potential Areas for Cost Savings

The analysis was focused on reaping benefits requiring the least amount of effort. If the engineers had better data, they could save the company money by making better choices on the parts they use or the new parts they specify.

If procurement had better data, they could increase leverage with suppliers. They could consolidate on similar items with preferred vendors and normalize the pricing differences on similar items.

Here are the 3 areas for potential benefit:

- New Part Request Mitigation: The duplicate and near duplicate analysis results show the potential of 25% duplicates and 50% near duplicates.
 - XXX new parts created each year
 - 20% of requests could have reused an existing screw – 56 screws/year
 - \$2,700 lifecycle costs of a part – design, procurement, inventory, material handling
 - Assumptions: \$2,700 screw lifecycle cost, XXX new screws per year, 20% re-use
 - **\$151k – Estimated Annual Savings** – (\$2.7k x 56 parts)
- Supplier Price Rationalization: There are large cluster groupings of similar screws, over 200 in the top 10 clusters. Each of these parts have very similar attribute characteristics with different pricing.
 - XXXk average annual volume per screw
 - Top 10 cluster groupings contain about 10 screws each
 - Total spend for each cluster - 10 items - XXXk avg volume/screw – 1 M total volume x \$.03/screw - \$30k (spend per cluster grouping)
 - Based new spend on best price for cluster – 1 M x \$.015/screw - \$15k
 - Estimated savings - 50% on price (normalize spend on clusters with suppliers)
 - How many clusters - 10% of screws clusters of 10 or more = 200 screws x XXk x \$.03/screw - \$600k spend
 - Estimated savings for 200 screws - \$300k if purchased at \$.015/screw - annual savings
 - Assumptions: XXXk volume per screw, \$.03 avg screw, \$.015 best price, 10% screws in clusters
 - **Estimated Annual Savings: \$300k/yr**
- Spot Buy Mitigation: We should look at the number of spot buys - low volume - add up that spend and compare with standard pricing
 - XXX low volume purchases (less than 1000) or 10% of buys
 - Typically low volume purchases pay 3 times high volume purchases
 - Estimate savings using existing inventory. Take 10% and multiple by 2/3
 - Total fastener spend - 1,900 screws - \$XXM

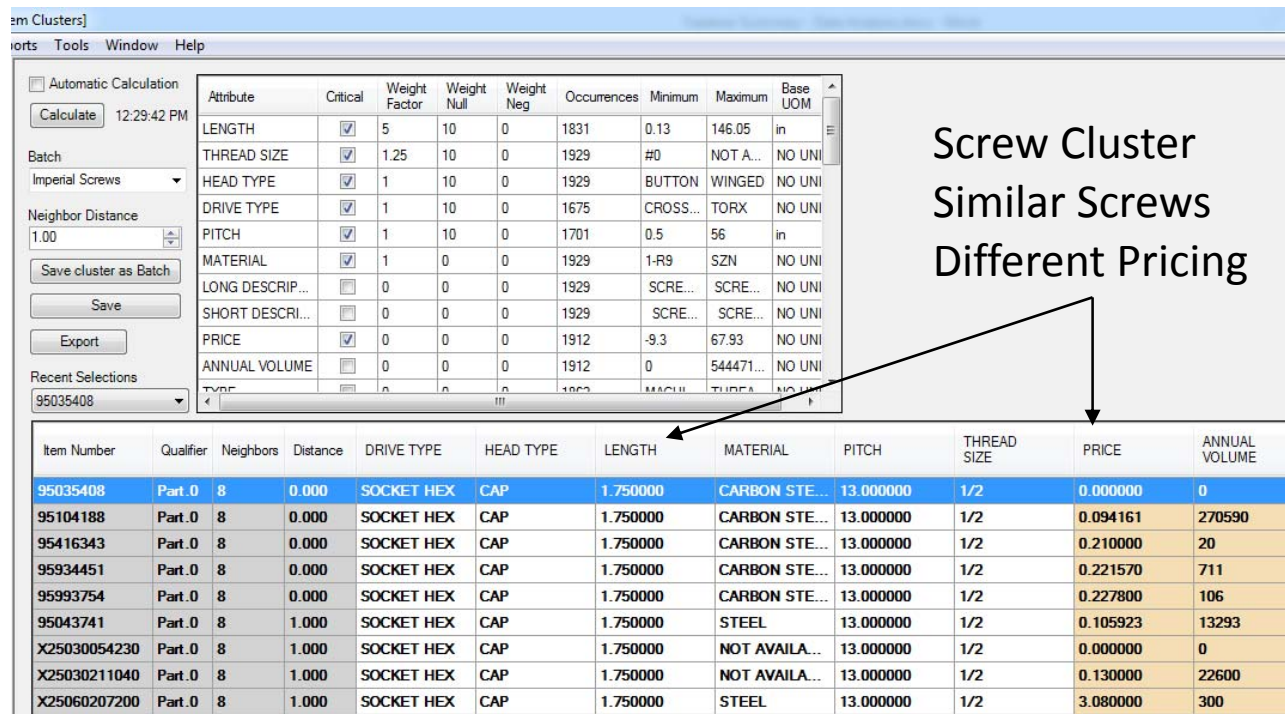
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- $\$XXM \times 10\% = \$900k$ spend - $\$900k = 3$ times avg pricing - should be $\$300k$ or $\$600k$ savings
- Assuming 30% (% with substitutes) of spot buys could be avoided - $.3 \times \$600k = \$180k$ savings
- Assumptions: $\$XXM$ annual screw spend, 10% spot buys,
- **Estimated Annual Savings: \$180k/yr**

Background Information on DFR's Clusters Analytical Tool

DFR's Clusters Tool uses several different criteria to identify similar groupings of parts based on attribute weightings and neighbor distance. Typically there are a select group of attributes used to identify clusters, the other attributes can be zeroed out. The neighbor distance determines the size of the clusters – the lower the neighbor distance the smaller the clusters and the more similar the items in the clusters. A neighbor distance of 1 was used for this analysis.



The screenshot shows the DFR Clusters Tool interface. On the left, there are controls for 'Automatic Calculation' (checked), 'Calculate' button, 'Batch' (Imperial Screws), 'Neighbor Distance' (1.00), 'Save cluster as Batch', 'Save', 'Export', and 'Recent Selections' (95035408). The main area displays a table of attributes with checkboxes for selection. The 'PRICE' attribute is highlighted. To the right, text reads 'Screw Cluster Similar Screws Different Pricing' with an arrow pointing to the 'PRICE' column in the resulting cluster table.

Attribute	Critical	Weight Factor	Weight Null	Weight Neg	Occurrences	Minimum	Maximum	Base UOM
LENGTH	<input checked="" type="checkbox"/>	5	10	0	1831	0.13	146.05	in
THREAD SIZE	<input checked="" type="checkbox"/>	1.25	10	0	1929	#0	NOT A...	NO UNI
HEAD TYPE	<input checked="" type="checkbox"/>	1	10	0	1929	BUTTON	WINGED	NO UNI
DRIVE TYPE	<input checked="" type="checkbox"/>	1	10	0	1675	CROSS...	TORX	NO UNI
PITCH	<input checked="" type="checkbox"/>	1	10	0	1701	0.5	56	in
MATERIAL	<input checked="" type="checkbox"/>	1	0	0	1929	1-R9	SZN	NO UNI
LONG DESCRI...	<input type="checkbox"/>	0	0	0	1929	SCRE...	SCRE...	NO UNI
SHORT DESCRI...	<input type="checkbox"/>	0	0	0	1929	SCRE...	SCRE...	NO UNI
PRICE	<input checked="" type="checkbox"/>	0	0	0	1912	-9.3	67.93	NO UNI
ANNUAL VOLUME	<input type="checkbox"/>	0	0	0	1912	0	544471...	NO UNI

Item Number	Qualifier	Neighbors	Distance	DRIVE TYPE	HEAD TYPE	LENGTH	MATERIAL	PITCH	THREAD SIZE	PRICE	ANNUAL VOLUME
95035408	Part.0	8	0.000	SOCKET HEX	CAP	1.750000	CARBON STE...	13.000000	1/2	0.000000	0
95104188	Part.0	8	0.000	SOCKET HEX	CAP	1.750000	CARBON STE...	13.000000	1/2	0.094161	270590
95416343	Part.0	8	0.000	SOCKET HEX	CAP	1.750000	CARBON STE...	13.000000	1/2	0.210000	20
95934451	Part.0	8	0.000	SOCKET HEX	CAP	1.750000	CARBON STE...	13.000000	1/2	0.221570	711
95993754	Part.0	8	0.000	SOCKET HEX	CAP	1.750000	CARBON STE...	13.000000	1/2	0.227800	106
95043741	Part.0	8	1.000	SOCKET HEX	CAP	1.750000	STEEL	13.000000	1/2	0.105923	13293
X25030054230	Part.0	8	1.000	SOCKET HEX	CAP	1.750000	NOT AVAILA...	13.000000	1/2	0.000000	0
X25030211040	Part.0	8	1.000	SOCKET HEX	CAP	1.750000	NOT AVAILA...	13.000000	1/2	0.130000	22600
X25060207200	Part.0	8	1.000	SOCKET HEX	CAP	1.750000	STEEL	13.000000	1/2	3.080000	300

Figure 8 DFR Clusters Tool Screen Shot