PERDUE FARM
LOGISTIC ANALYSIS

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INTRODUCTION

As a family-owned company, Perdue Farms always focuses on growth and innovation to produce the best products for its customers. In this case study, Perdue Farms is seeking to analyze its transportational cost through data and logistics. As transporting goods is always a concern, Perdue Farms aim to reduce the excessive amount of time spent on deliveries. To combat delayed deliveries and decreasing on-time performance of their drivers, they are introducing usage of drop trailers. These trailers are projected to reduce held time to 1 hour and save up to $65 per hour in wages and opportunity cost. However, drop trailers must be provided by Perdue and are only limited to delivery with one destination. With the given 3 datasets, the following analysis will determine which implementation of drop trailers would most benefit Perdue Farms.

METHODOLOGY

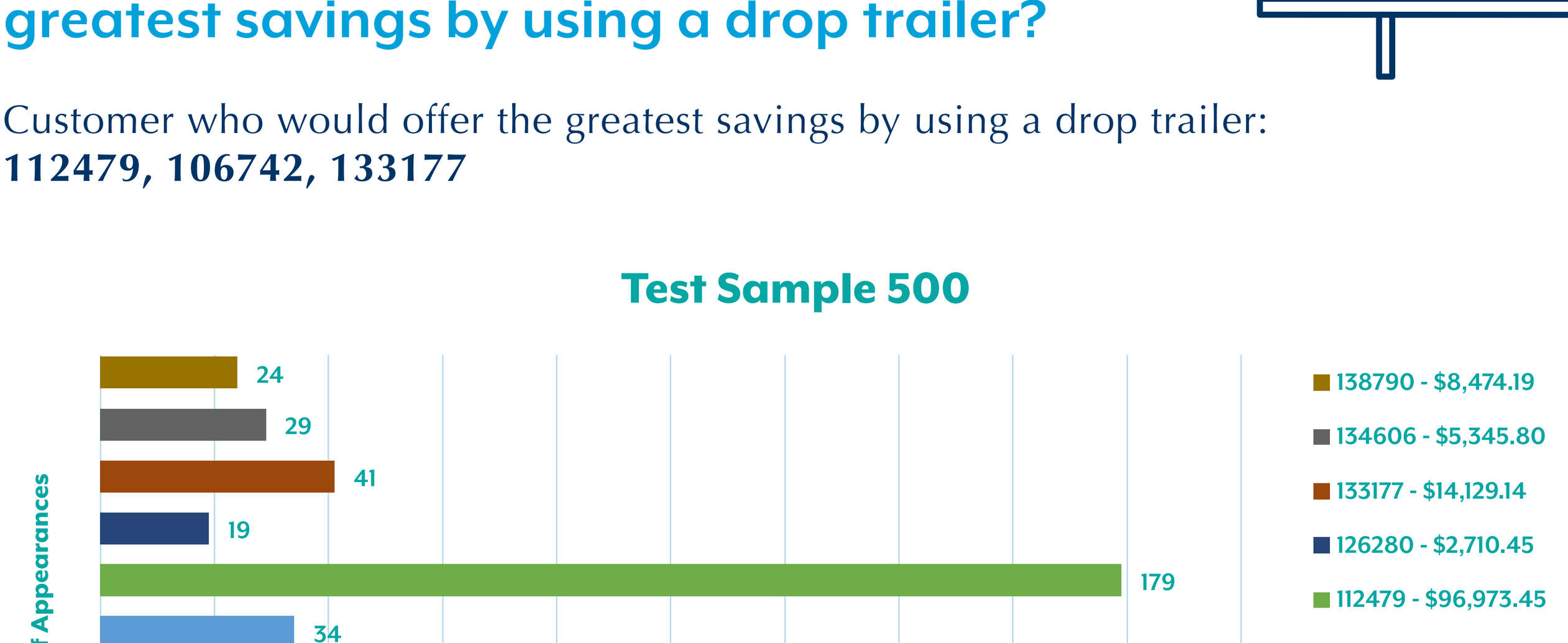
Python-Pandas and **NumPy** packages are utilized to clean and analyze the datasets. First, the datasets are cleaned by converting incorrect data types into the correct types. Then, all **Date** and **Time** entries are merged into a **DateTime** format. *TMS Data* and *On Time, Held Time* datasets are merged through **Load #** and **Shipment Number**.

ANALYSIS

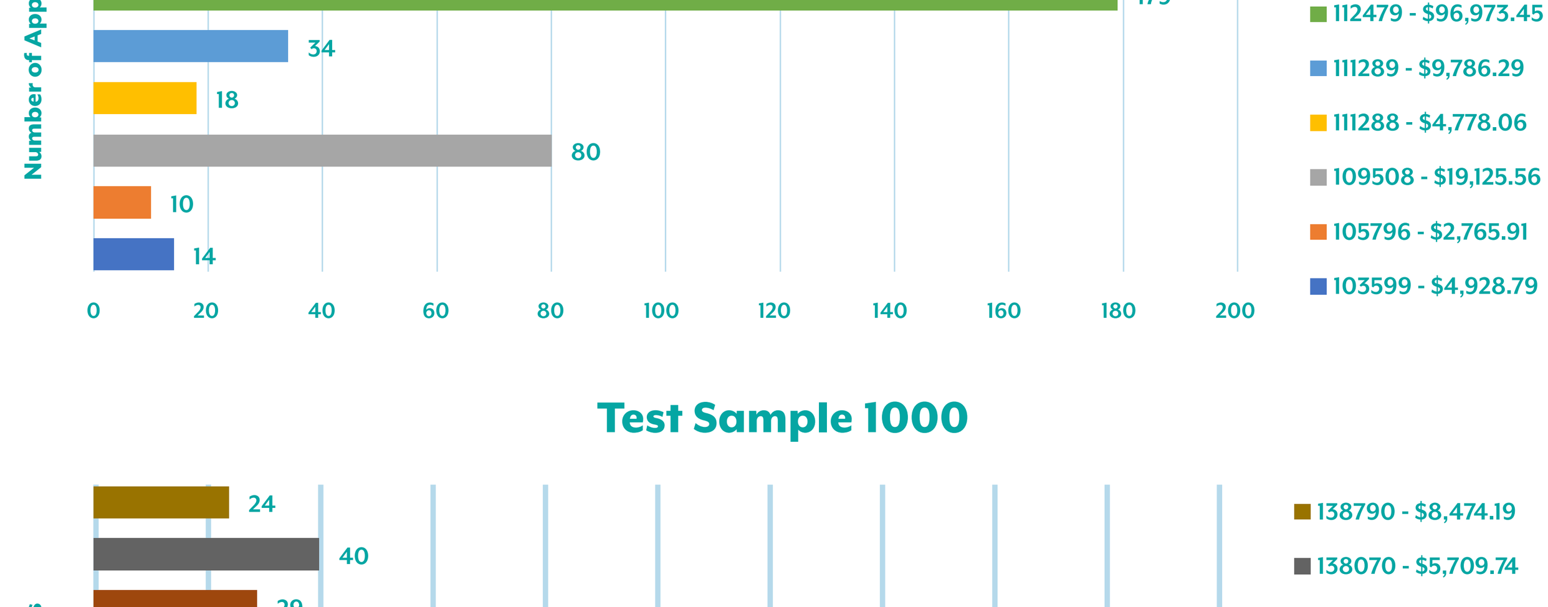
1 Which customers would offer the greatest savings by using a drop trailer?

Customer who would offer the greatest savings by using a drop trailer:
112479, 106742, 133177

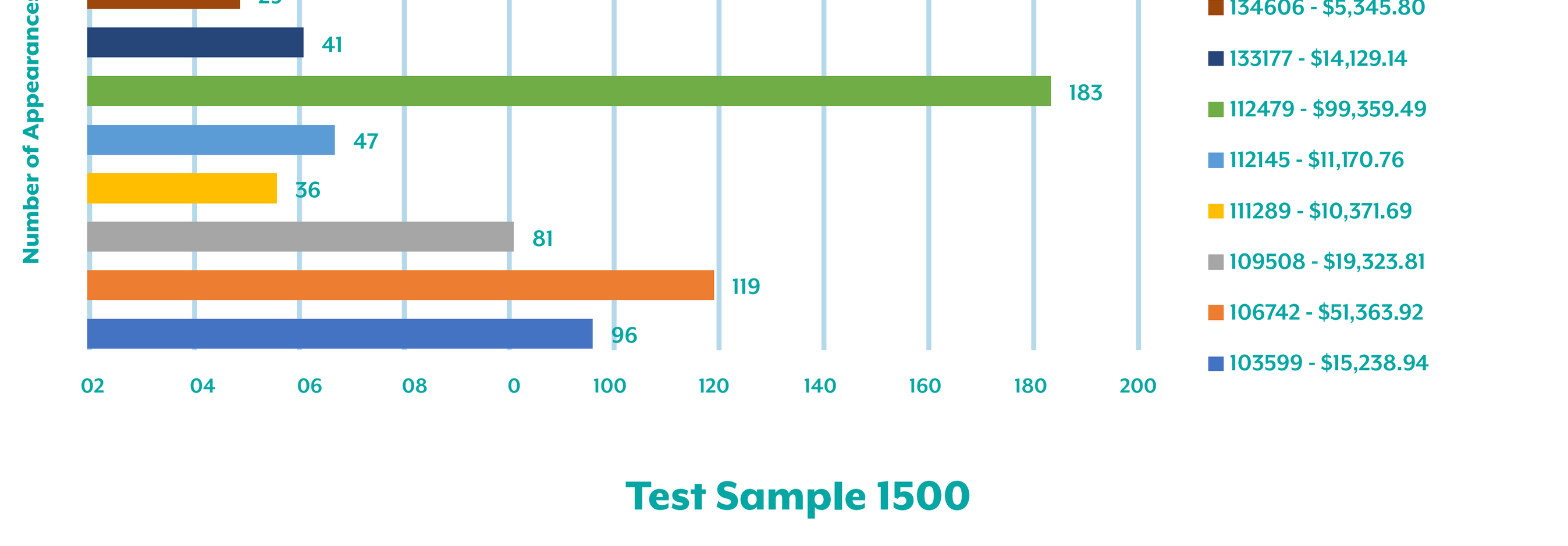
Test Sample 500



Test Sample 1000



Test Sample 1500

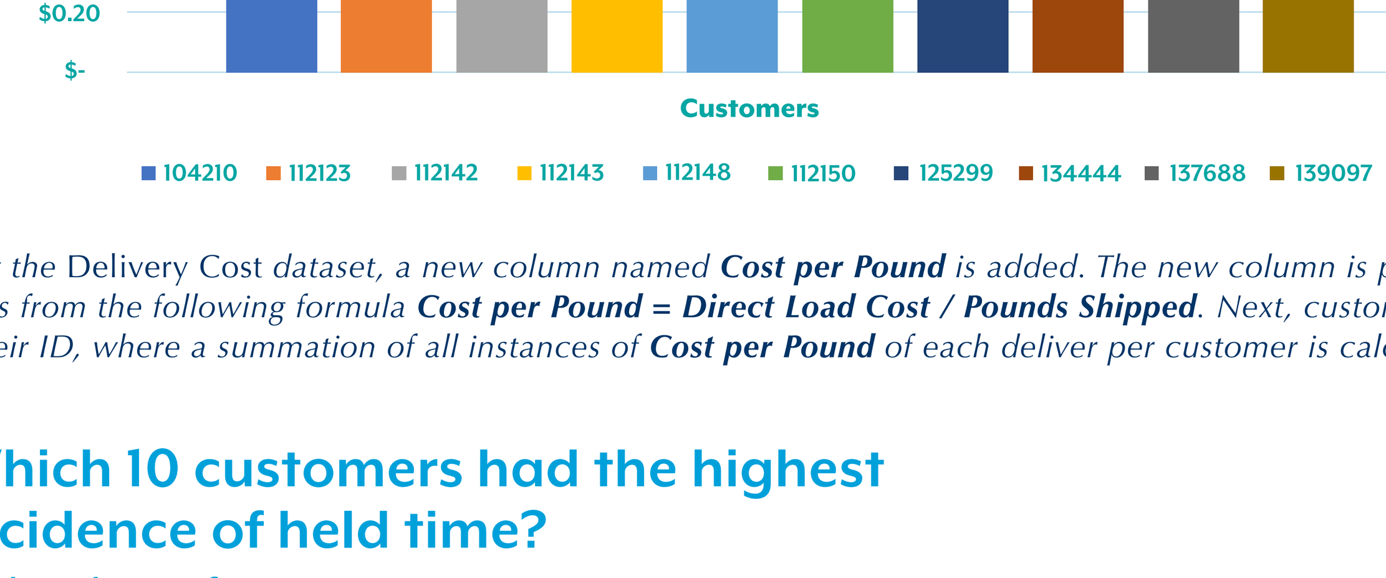


TMS Data *and* On Time, Held Time *datasets are merged together; where columns:* ***Shippment Number, Carrier Name*** *and* ***Dropoff ID*** *of* TMS Data *are merged with columns:* ***Load #, Carrier Name*** *and* ***Sold To*** *of* On Time, Held Time*, respectively. The resulting merge is filtered to insure* ***Carrier Name = Perdue, # of Stops = 1 & HELD >= 1 hour****. Next,* ***Held time*** *is sorted by largest. Appearance count is then made and applied it to the top x customer in held time. This allowed a clear depiction of how many times a customer within that top x* ***Held time****. Sample size is created from top 10 number of apperance of the top 10 Held time to top 500, 1000 & 1500. With those sample the top 3 customer were constant.*

2 What are the top 10 customers with the highest per pound delivery cost?

Top 10 customers highest per pound delivery cost:
136929, 109524, 135066, 105056, 121171, 113214, 107916, 112148, 121826, 120960]

Top 10 Customers with Highest Per Pound Delivery Cost



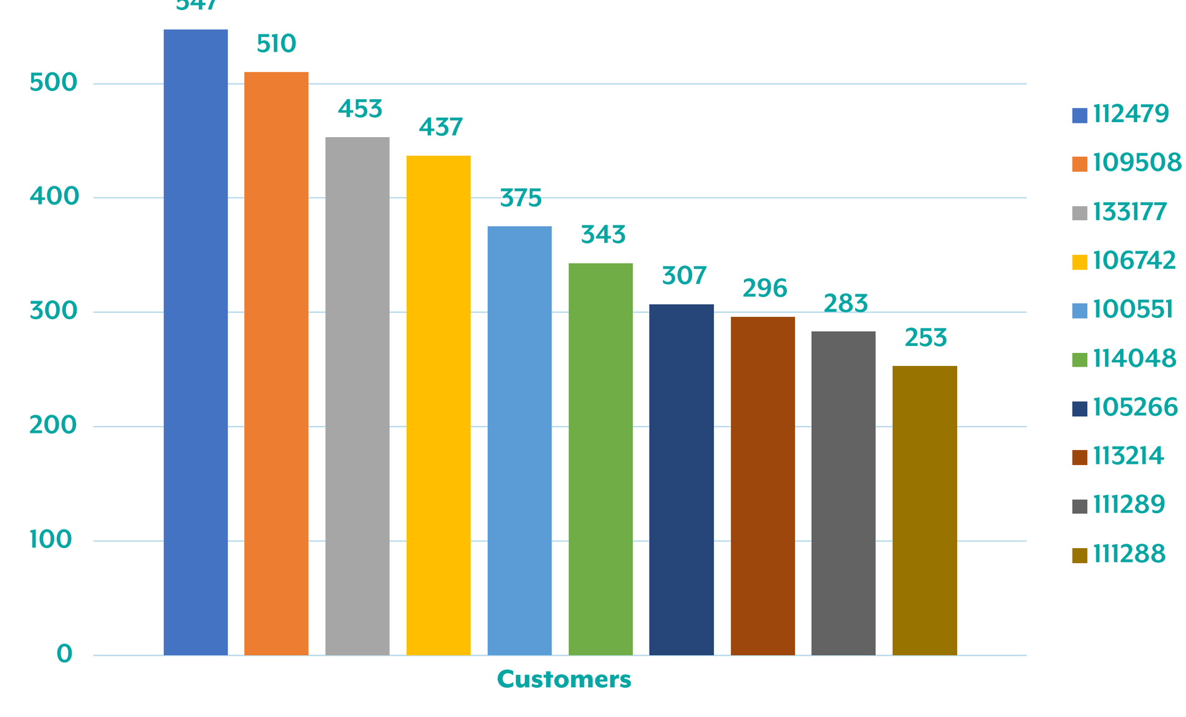
Using the Delivery Cost dataset, a new column named ***Cost per Pound*** *is added. The new column is populated with results from the following formula* ***Cost per Pound = Direct Load Cost / Pounds Shipped****. Next, customers are grouped by their ID, where a summation of all instances of* ***Cost per Pound*** *of each deliver per customer is calculated.*

3 Which 10 customers had the highest incidence of held time?

A. Number of occurrences
B. Percent of deliveries
C. Overall cost of occurrences

A. Top 10 customers with the highest number of occurred Incidence are :
112479, 109508, 133177, 106742, 100551, 114048,105266, 113214, 111289, 111288

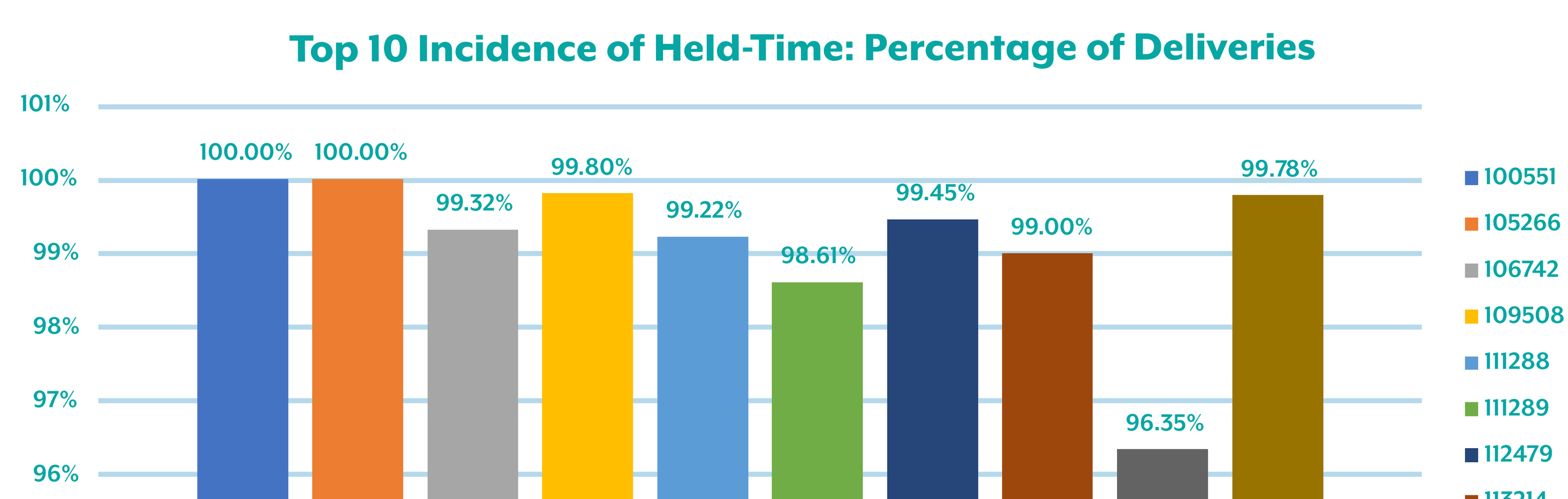
Top 10 Customers Had the Highest Number of Occurences



A new column called ***Incident Count*** *is added; an* ***Incident Count*** *occurs when* ***Held Time*** *is greater than or equal to 1 second per delivery. Next, a summation is made for all* ***Incident Count*** *per customer.* ***Incident Count*** *is then sorted from greatest to least, revealing the top 10 customers who had the highest number of occurrences.*

B. Top 10 customers with the highest percent of Incidence per Delivery:
112479, 109508, 133177, 106742, 100551, 114048, 105266, 113214, 111289, 111288

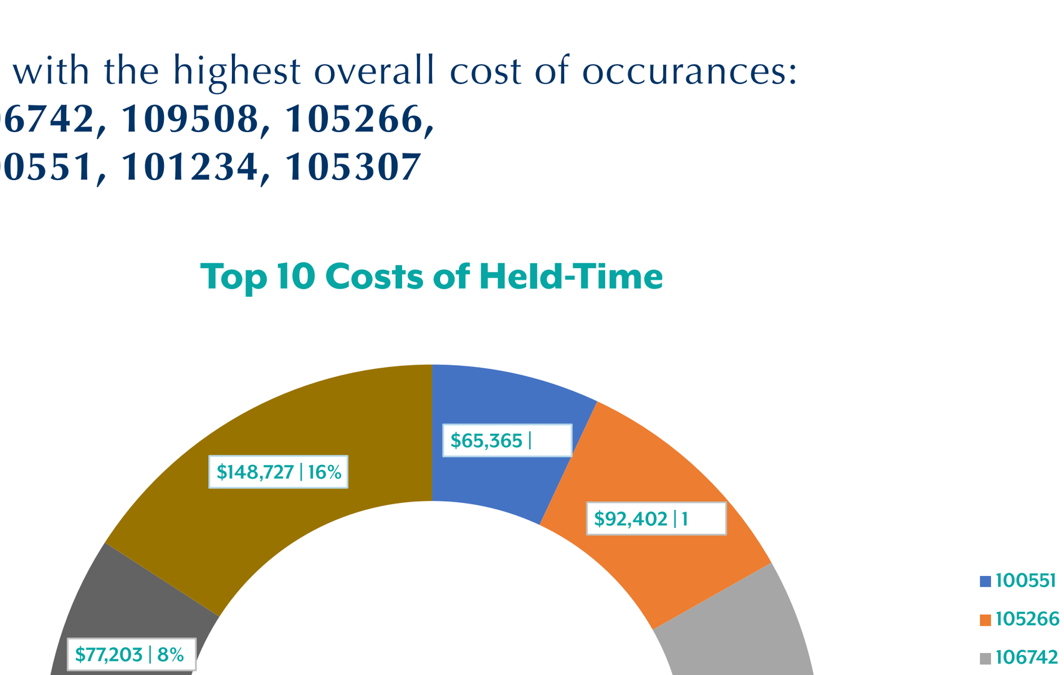
Top 10 Incidence of Held-Time: Percentage of Deliveries



A ***Deliver Count*** *column is added, where every entry is assigned a delivery count of at least 1. Next, a summation of all* ***Incident Count*** *and* ***Deliver Count*** *is made per customer. Finally, the results come from populating* ***% of Incident per Delivery = (Incident Count / Delivery Count) * 100****.*

C. Top 10 customers with the highest overall cost of occurances:
112479, 133177, 106742, 109508, 105266, 114048, 107847, 100551, 101234, 105307

Top 10 Costs of Held-Time



First, created a new column ***Cost of Incidence****. Then converted* ***Held Time*** *to seconds to determine accurate* ***Cost of Incidence****. If* ***Held Time*** *= 0, then* ***Cost of Incidence*** *= 0,* ***Incidence Count*** *= 0. However, if* ***Held Time*** *> 0, then* ***Cost of Incidence*** *=* ***Held Time*** ** (65/3600(secs)),* ***Incidence Count*** *= 1. Finally, a summation of* ***Cost of Incidence*** *is made for each customer.*

4 Which 10 customers had the most held time?

A. Total hours
B. Hours per delivery

A. Top 10 customers with the most held time (*Total hours):
112479, 133177, 106742, 109508, 105266, 114048, 107847, 100551, 101234, 105307] 4180888, 4142828, 4107786, 4148219, 4168896

Top 10 Most Held-Time

Ranking	Customers	Held-Time
1	112479	143 days 20:44:35
2	133177	95 days 08:06:08
3	106742	70 days 10:51:21
4	109508	59 days 07:59:02
5	105266	59 days 05:34:29
6	114048	49 days 11:44:30
7	107847	43 days 22:08:51
8	100551	41 days 21:36:59
9	101234	40 days 19:28:03
10	105307	37 days 17:06:12

A summation of ***Held Time*** *is made for per customer then the Top 10* ***Held Time*** *customers are revealed.*

B. Top 10 customers with the most held time (*per Delivery):
129289, 112654, 137336, 109884, 121047, 139933,135015, 134182, 113832, 120489

Top 10 Most Held-Time per Delivery

Ranking	Customers	Held-Time per Delivery	Delivery Cost
1	112479	06:16:39	550
2	133177	05:02:23	454
3	106742	04:37:49	307
4	109508	03:50:34	440
5	105266	03:20:10	356
6	114048	02:47:11	511
7	107847	02:40:53	376
8	100551	02:31:28	287
9	101234	02:14:34	255
10	105307	02:13:33	299

Using ***Delivery Count****, populated* ***Held Time per Delivery = Total Held Time / Total Delivery*** *to calculate hours per delivery.*

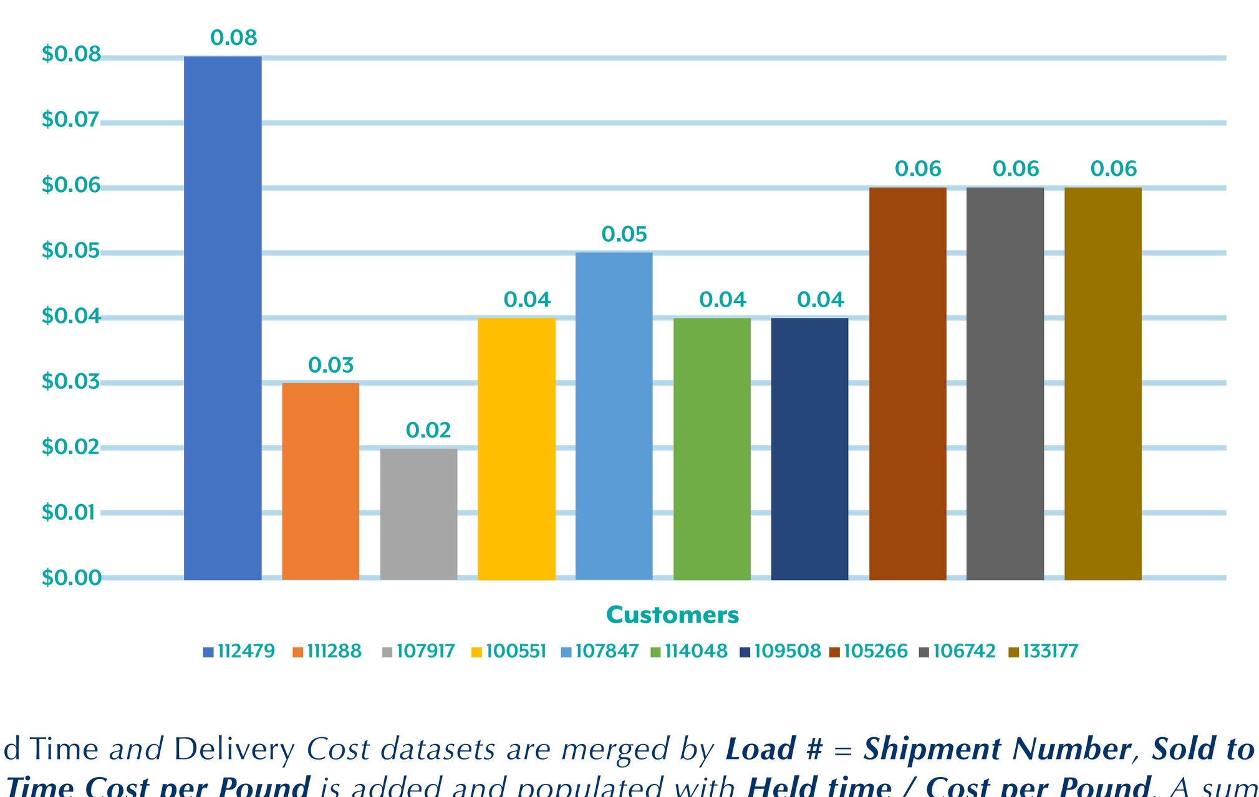
5 What are the top 10 customers in held time cost per pound?

The top 10 customers in held time cost per pound:
120619, 126397, 137528, 134388, 133866, 110300, 107917, 129891, 137640, 113204

Top 10 Most Held-Time

Customers	Total Held Time	Total Cost Per Pound
112479	142 days 19:39:14	$0.08
105266	59 days 05:34:29	$0.06
106742	70 days 08:20:36	$0.06
133177	94 days 18:19:06	$0.06
107847	43 days 12:19:03	$0.05
100551	41 days 13:22:38	$0.04
114048	49 days 01:30:12	$0.04
109508	58 days 12:07:15	$0.04
111288	23 days 09:48:54	$0.03
107917	33 days 02:02:00	$0.02

Top 10 Total Held-Time Cost Per Pound



On Time, Held Time and Delivery Cost datasets are merged by ***Load # = Shipment Number****,* ***Sold to = Customer****. A new column* ***Held Time Cost per Pound*** *is added and populated with* ***Held time / Cost per Pound****. A summation of* ***Held Time Cost per Pound*** *is made per customer ID.*