

OMCC Texas Level Competition

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Introduction :

- **AIM** : To make a competitive & efficient proposal for transporting Machines to construction site on or before time & at a minimal cost under trade-off policy.



Data Interpretation :

- We visualized the given data using **Tableau** tool.
- The 'Data interpreter' option in Tableau was used to 'Join' the Product Location, OTR rates & Product Description tables.
- **Scaling** : Converted (scaled) all units in the resultant table to common standards. Eg : Height, Width, Length - 'inches', rates per mile, etc.
- **Calculation** : Calculated the Fuel Surcharge Charge using the given formula. Also calculated the % variation in charges for different trailers – all into one single large resultant table.

Source_City	Source_St	Mode Of T	Number of	Product	Quantity	Rate/Mile	Weight
BALTIMORE	MD	OTR	1		1	1.85	154037
CHICAGO	IL	OTR	1		1	2.17	154037
ORLANDO	FL	OTR	1		1	1.59	154037
LOS ANGELES	CA	OTR	1	CATERPILL	1	1.73	144190
SAN DIEGO	CA	OTR	1	CATERPILL	1	2.49	144190
NEWARK	NJ	OTR	1	CATERPILL	1	1.75	144190
DETROIT	MI	OTR	1	CRATE OF	1	1.96	2100
COLUMBUS	OH	OTR	1	CRATE OF	1	2.03	2100
CLEVELAND	OH	OTR	1	CRATE OF	1	2	2100
SEATTLE	WA	OTR	1	CATERPILL	1	1.64	124402.5
ATLANTA	GA	OTR	1	CATERPILL	1	2.32	124402.5
DENVER	CO	OTR	1	CATERPILL	1	1.48	124402.5

Height(Inch)	Length(Inch)	Width(Inch)	Days	Destination	Destination	FSC / mile	LINE HAU
138	184	137	2	DALLAS	TX	0.399917	1.450083
138	184	137	2	DALLAS	TX	0.399917	1.770083
138	184	137	2	DALLAS	TX	0.399917	1.190083
161	304	124	2	DALLAS	TX	0.399917	1.330083
161	304	124	2	DALLAS	TX	0.399917	2.090083
161	304	124	2	DALLAS	TX	0.399917	1.350083
48	48	48	3	DALLAS	TX	0.399917	1.560083
48	48	48	3	DALLAS	TX	0.399917	1.630083
48	48	48	3	DALLAS	TX	0.399917	1.600083
193	386	137	2	DALLAS	TX	0.399917	1.240083
193	386	137	2	DALLAS	TX	0.399917	1.920083
193	386	137	2	DALLAS	TX	0.399917	1.080083



Tableau interpreted Table :

File Data Server Window Help

Connections [Add](#)

OMCC2017Final
Excel

Sheets

☒ Cleaned with Data Interpreter
[Review the results.](#) (To undo changes, clear the check box.)

- HISTORICAL DIESEL PRICES
- OTR PERMIT TABLE
- OTR RATES - LANE RATES
- PRODUCT DESCRIPTION
- PRODUCT LOCATIONS
- RAIL LANE RATES
- Route
- Trailer
- PRODUCT LOCATIONS A3:E16
- PRODUCT LOCATIONS A19:I22
- PRODUCT LOCATIONS A26:E30
- New Union

PRODUCT LOCATIONS A3:E16+ (OMCC2017Final)

Connection ☒ Live ☐ Extract

Filters 0 | [Add](#)

PRODUCT LOCATIONS A3:... OTR RATES - LANE RATES Route

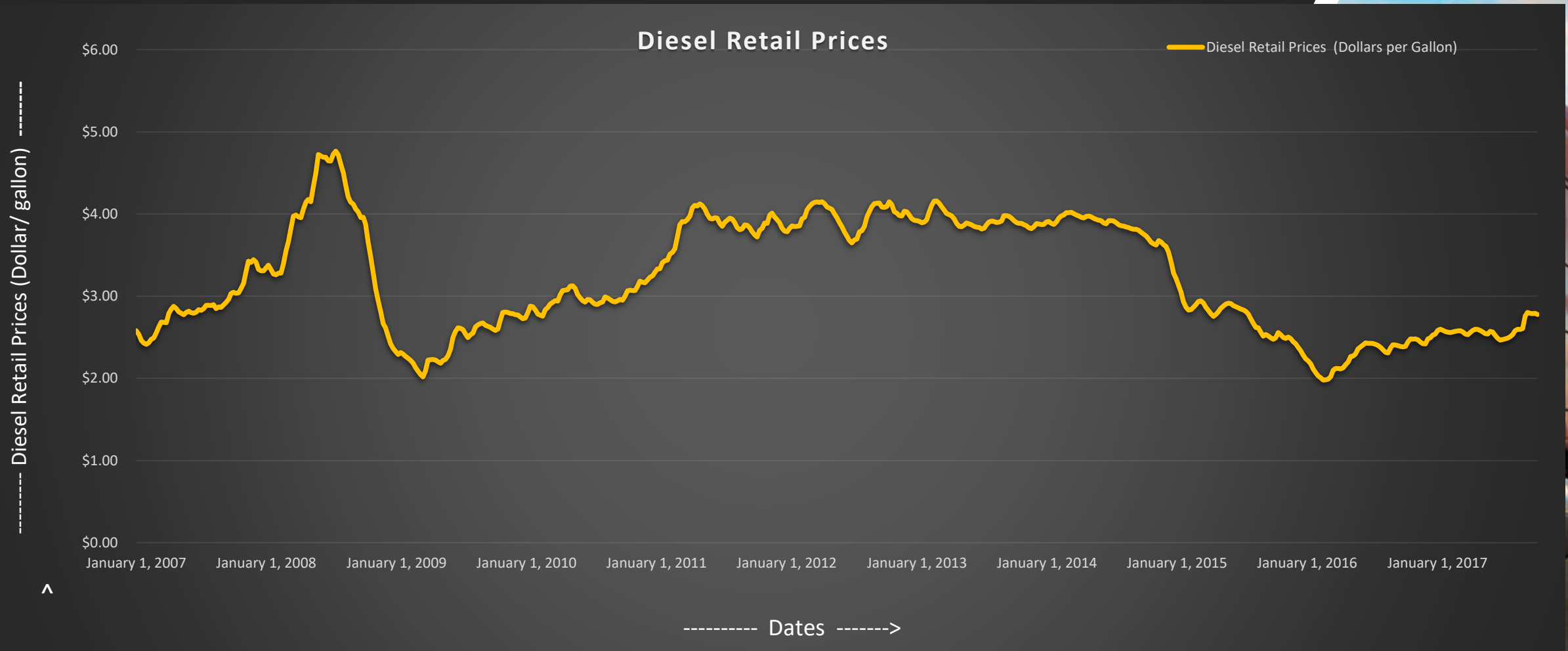
PRODUCT DESCRIPTION

Sort fields Modified

☐ Show aliases ☐ Show hidden fields 12 rows

#	#	#	#	#	#	#	#	Abc	Abc	Calculation
OTR RATES - LANE RA... Rate/Mile Bef...	OTR RATES - LANE RA... FSC / mile(PL...	OTR RATES - LANE RA... LINE HAUL/m...	PRODUCT DES... Quantity	Calculation Length(Inches)	Calculation Width(Inches)	Calculation Height(Inches)	PRODUCT DES... Weight	PRODUCT LOCATION... Product	PRODUCT LOCATION... Mode Of Trans...	Calculation Source_City
1.85000	0.399917	1.45008	1	184	137	138	154,037.00	CATERPILLAR	OTR	BALTIMORE
2.17000	0.399917	1.77008	1	184	137	138	154,037.00	CATERPILLAR	OTR	CHICAGO
1.59000	0.399917	1.19008	1	184	137	138	154,037.00	CATERPILLAR	OTR	ORLANDO
1.73000	0.399917	1.33008	1	304	124	161	144,190.00	CATERPILLAR D1...	OTR	LOS ANGELES
2.49000	0.399917	2.09008	1	304	124	161	144,190.00	CATERPILLAR D1...	OTR	SAN DIEGO
1.75000	0.399917	1.35008	1	304	124	161	144,190.00	CATERPILLAR D1...	OTR	NEWARK
1.96000	0.399917	1.56008	1	48	48	48	2,100.00	CRATE OF PLASTI...	OTR	DETROIT
2.03000	0.399917	1.63008	1	48	48	48	2,100.00	CRATE OF PLASTI...	OTR	COLUMBUS
2.00000	0.399917	1.60008	1	48	48	48	2,100.00	CRATE OF PLASTI...	OTR	CLEVELAND
1.64000	0.399917	1.24008	1	386	137	193	124,402.50	CATERPILLAR 77...	OTR	SEATTLE

Minimum Diesel Price variation (2007-2017):



OTR

Fuel Surcharge and Line/Haul

- Found the minimum of Diesel Price and calculated FSC using Oct 30 2017 Diesel price
- Calculated Line/Haul from each city
- Calculated Line /Haul for all the different Trailers

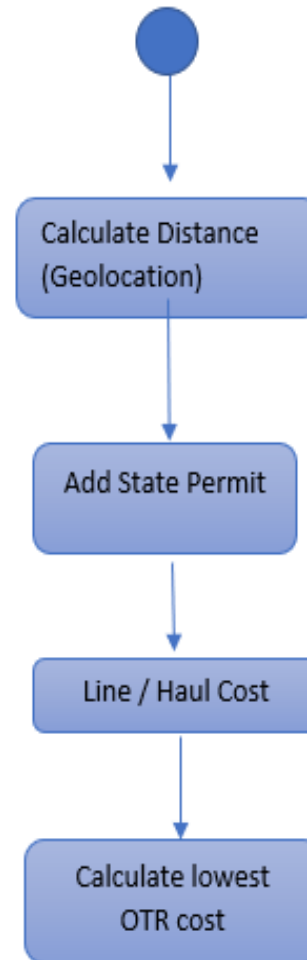
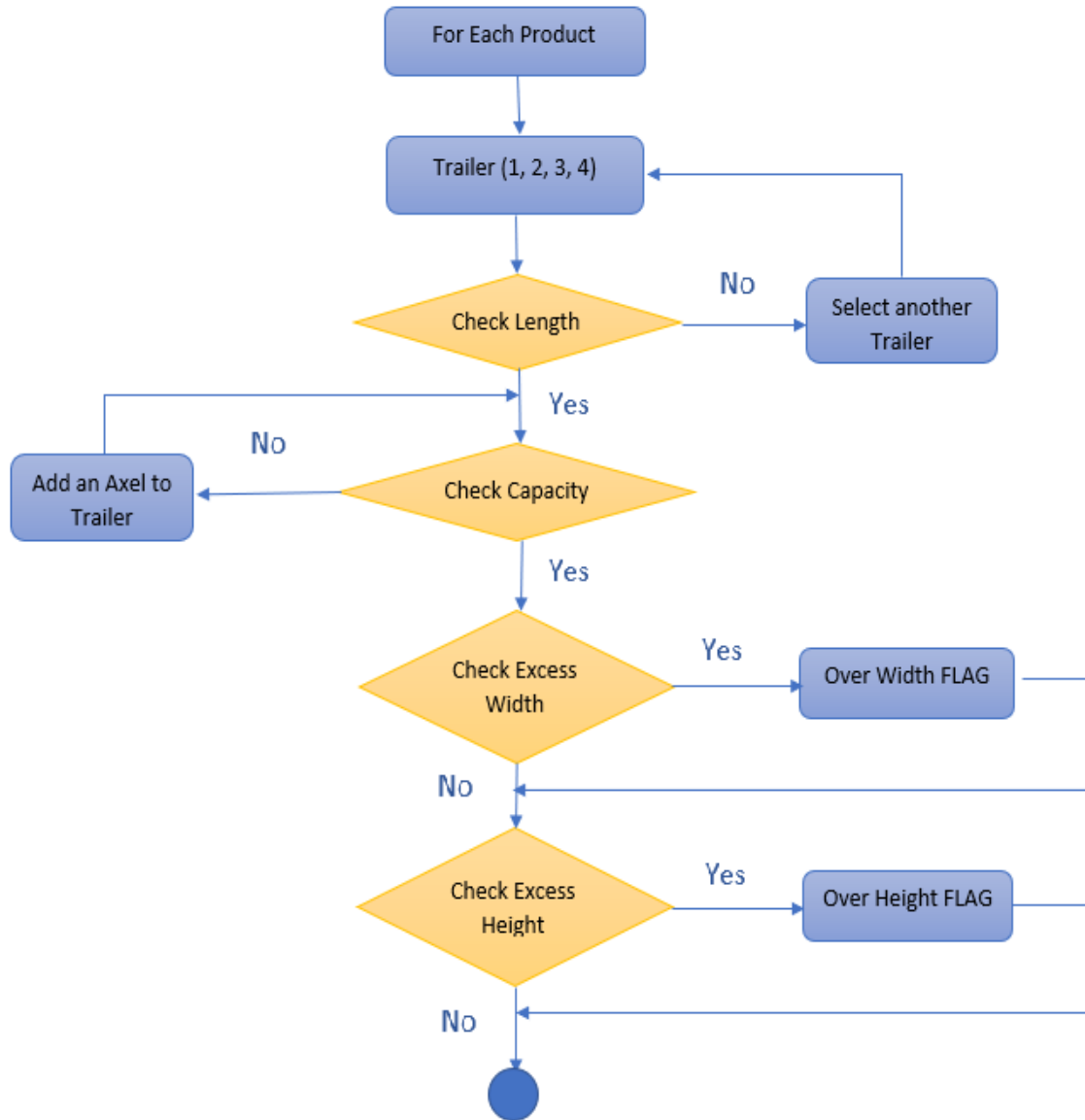


Pick-up city distance calculation:

- Used **Python** data frame to interpret and analyze the data.
- Retrieved the exact shortest GPS distance between all the city locations from where the Products must be collected to Dallas using a Python package called '**Geo-location**'.



Code - Flow chart :



OTR

- For each Product and for each trailer, compared the dimension and set the OVER_WIDTH/OVER_HEIGHT flag accordingly
- Checked route and added state permit accordingly
- Saved the cost to data frame

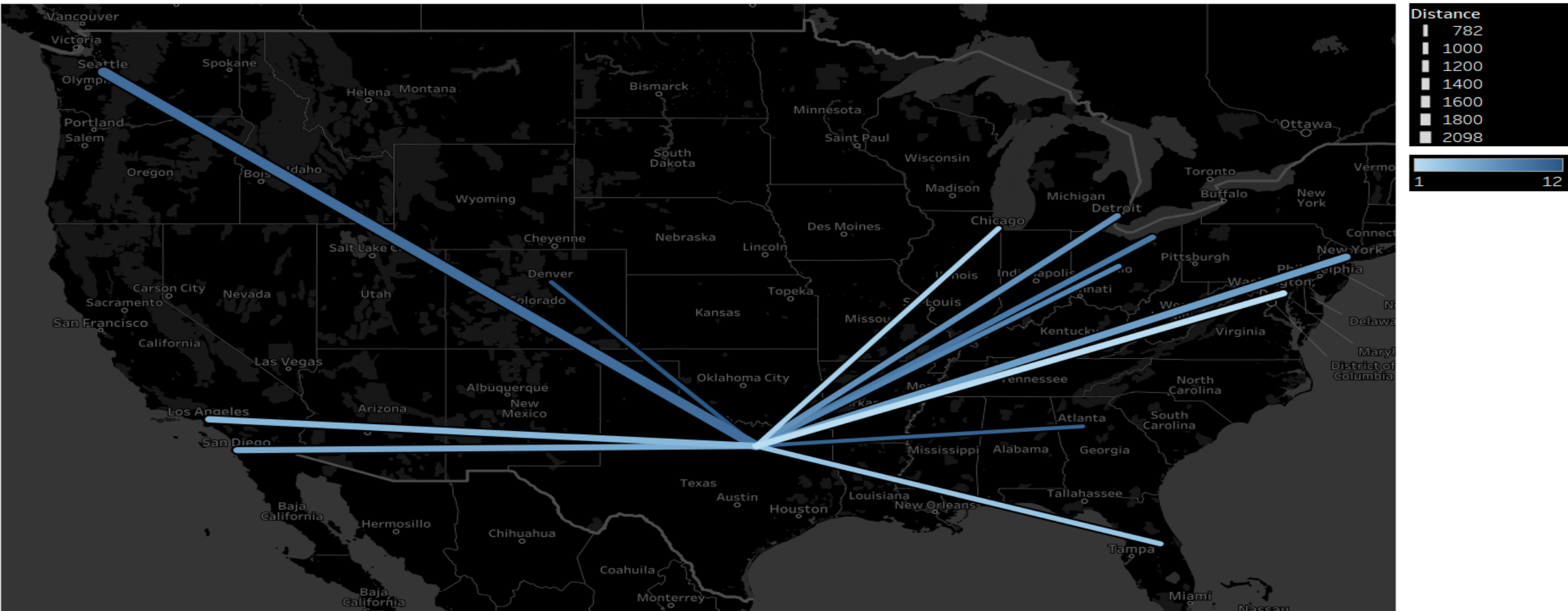
SOURCE	DESTINATION	ROUTE
LOS ANGELES	DALLAS	CA,AZ,NM,TX
NEWARK	DALLAS	NJ,PA,MD,WV,VA,TN,AK,TX
BALTIMORE	DALLAS	MD,VA,TN,AK,TX
CHICAGO	DALLAS	IL,MO,AK
ORLANDO	DALLAS	AL,MI,LA,TX
SAN DIEGO	DALLAS	CA,AZ,NM,TX
DETROIT	DALLAS	MI,OH,IN,IL,MO,AK,TX
COLUMBUS	DALLAS	OH,KY,TN,AK,TX
CLEVELAND	DALLAS	OH,KY,TN,AK,TX
SEATTLE	DALLAS	WA,OR,ID,UT,CO,NM,TX
ATLANTA	DALLAS	AL,MI,LA,TX
DENVER	DALLAS	CO,NM,TX

Height(Inch)	Length(Inch)	Width(Inch)	Days	Destination	Destination	FSC / mile	LINE HAUL	Source_City	Source_State	Mode Of Transport	Number of	Product	Quantity	Rate/Mile	Weight	Location	Distance	Picked	Trailer1	Trailer2	Trailer3	Trailer4
138	184	137	2	DALLAS-FC	TX	0.399917	1.450083	BALTIMORE	MD	OTR	1	CATERPILLAR	1	1.85	154037	BALTIMORE	1365.771	TRUE	4430.482	4727.555	4727.555	4826.579
138	184	137	2	DALLAS-FC	TX	0.399917	1.450083	DALLAS	TX	OTR	1	CATERPILLAR	1	1.85	154037	BALTIMORE	1365.771	TRUE	4430.482	4727.555	4727.555	4826.579
138	184	137	2	DALLAS-FC	TX	0.399917	1.770083	CHICAGO	IL	OTR	1	CATERPILLAR	1	2.17	154037	CHICAGO,IL	967.4731	TRUE	2912.508	3169.384	3169.384	3255.01
138	184	137	2	DALLAS-FC	TX	0.399917	1.770083	DALLAS	TX	OTR	1	CATERPILLAR	1	2.17	154037	CHICAGO,IL	967.4731	TRUE	2912.508	3169.384	3169.384	3255.01
138	184	137	2	DALLAS-FC	TX	0.399917	1.190083	ORLANDO	FL	OTR	1	CATERPILLAR	1	1.59	154037	ORLANDO	1084.291	TRUE	2890.396	3083.956	3083.956	3148.475
138	184	137	2	DALLAS-FC	TX	0.399917	1.190083	DALLAS	TX	OTR	1	CATERPILLAR	1	1.59	154037	ORLANDO	1084.291	TRUE	2890.396	3083.956	3083.956	3148.475
161	304	124	2	DALLAS-FC	TX	0.399917	1.330083	LOS ANGELES	CA	OTR	1	CATERPILLAR	1	1.73	144190	LOS ANGELES	1436.607	TRUE	3849.808	4136.429	4136.429	4231.969
161	304	124	2	DALLAS-FC	TX	0.399917	1.330083	DALLAS	TX	OTR	1	CATERPILLAR	1	1.73	144190	LOS ANGELES	1436.607	TRUE	3849.808	4136.429	4136.429	4231.969
161	304	124	2	DALLAS-FC	TX	0.399917	2.090083	SAN DIEGO	CA	OTR	1	CATERPILLAR	1	2.49	144190	SAN DIEGO	1358.315	TRUE	5116.991	5542.84	5542.84	5684.789
161	304	124	2	DALLAS-FC	TX	0.399917	2.090083	DALLAS	TX	OTR	1	CATERPILLAR	1	2.49	144190	SAN DIEGO	1358.315	TRUE	5116.991	5542.84	5542.84	5684.789
161	304	124	2	DALLAS-FC	TX	0.399917	1.350083	NEWARK	NJ	OTR	1	CATERPILLAR	1	1.75	144190	NEWARK,NJ	1537.891	TRUE	6401.281	6712.723	6712.723	6816.537
161	304	124	2	DALLAS-FC	TX	0.399917	1.350083	DALLAS	TX	OTR	1	CATERPILLAR	1	1.75	144190	NEWARK,NJ	1537.891	TRUE	6401.281	6712.723	6712.723	6816.537
48	48	48	3	DALLAS-FC	TX	0.399917	1.560083	DETROIT	MI	OTR	1	CRATE OF	1	1.96	2100	DETROIT,MI	1198.623	TRUE	4669.951	4950.444	4950.444	5043.942
48	48	48	3	DALLAS-FC	TX	0.399917	1.560083	DALLAS	TX	OTR	1	CRATE OF	1	1.96	2100	DETROIT,MI	1198.623	TRUE	4669.951	4950.444	4950.444	5043.942
48	48	48	3	DALLAS-FC	TX	0.399917	1.630083	COLUMBUS	OH	OTR	1	CRATE OF	1	2.03	2100	COLUMBUS	1040.795	TRUE	3696.582	3951.069	3951.069	4035.899
48	48	48	3	DALLAS-FC	TX	0.399917	1.630083	DALLAS	TX	OTR	1	CRATE OF	1	2.03	2100	COLUMBUS	1040.795	TRUE	3696.582	3951.069	3951.069	4035.899
48	48	48	3	DALLAS-FC	TX	0.399917	1.600083	CLEVELAND	OH	OTR	1	CRATE OF	1	2	2100	CLEVELAND	1183.089	TRUE	3893.04	4176.996	4176.996	4271.648
48	48	48	3	DALLAS-FC	TX	0.399917	1.600083	DALLAS	TX	OTR	1	CRATE OF	1	2	2100	CLEVELAND	1183.089	TRUE	3893.04	4176.996	4176.996	4271.648
193	386	137	2	DALLAS-FC	TX	0.399917	1.240083	SEATTLE	WA	OTR	1	CATERPILLAR	1	1.64	124402.5	SEATTLE,WA	2098.367	TRUE	7097.149	7487.472	0	7617.579
193	386	137	2	DALLAS-FC	TX	0.399917	1.240083	DALLAS	TX	OTR	1	CATERPILLAR	1	1.64	124402.5	SEATTLE,WA	2098.367	TRUE	7097.149	7487.472	0	7617.579
193	386	137	2	DALLAS-FC	TX	0.399917	1.920083	ATLANTA	GA	OTR	1	CATERPILLAR	1	2.32	124402.5	ATLANTA,GA	781.6835	TRUE	3100.897	3326.032	0	3401.077
193	386	137	2	DALLAS-FC	TX	0.399917	1.920083	DALLAS	TX	OTR	1	CATERPILLAR	1	2.32	124402.5	ATLANTA,GA	781.6835	TRUE	3100.897	3326.032	0	3401.077
193	386	137	2	DALLAS-FC	TX	0.399917	1.080083	DENVER	CO	OTR	1	CATERPILLAR	1	1.48	124402.5	DENVER,CO	792.8681	TRUE	2395.364	2523.818	0	2566.636
193	386	137	2	DALLAS-FC	TX	0.399917	1.080083	DALLAS	TX	OTR	1	CATERPILLAR	1	1.48	124402.5	DENVER,CO	792.8681	TRUE	2395.364	2523.818	0	2566.636



Pick-up city Distance Map - towards Dallas:

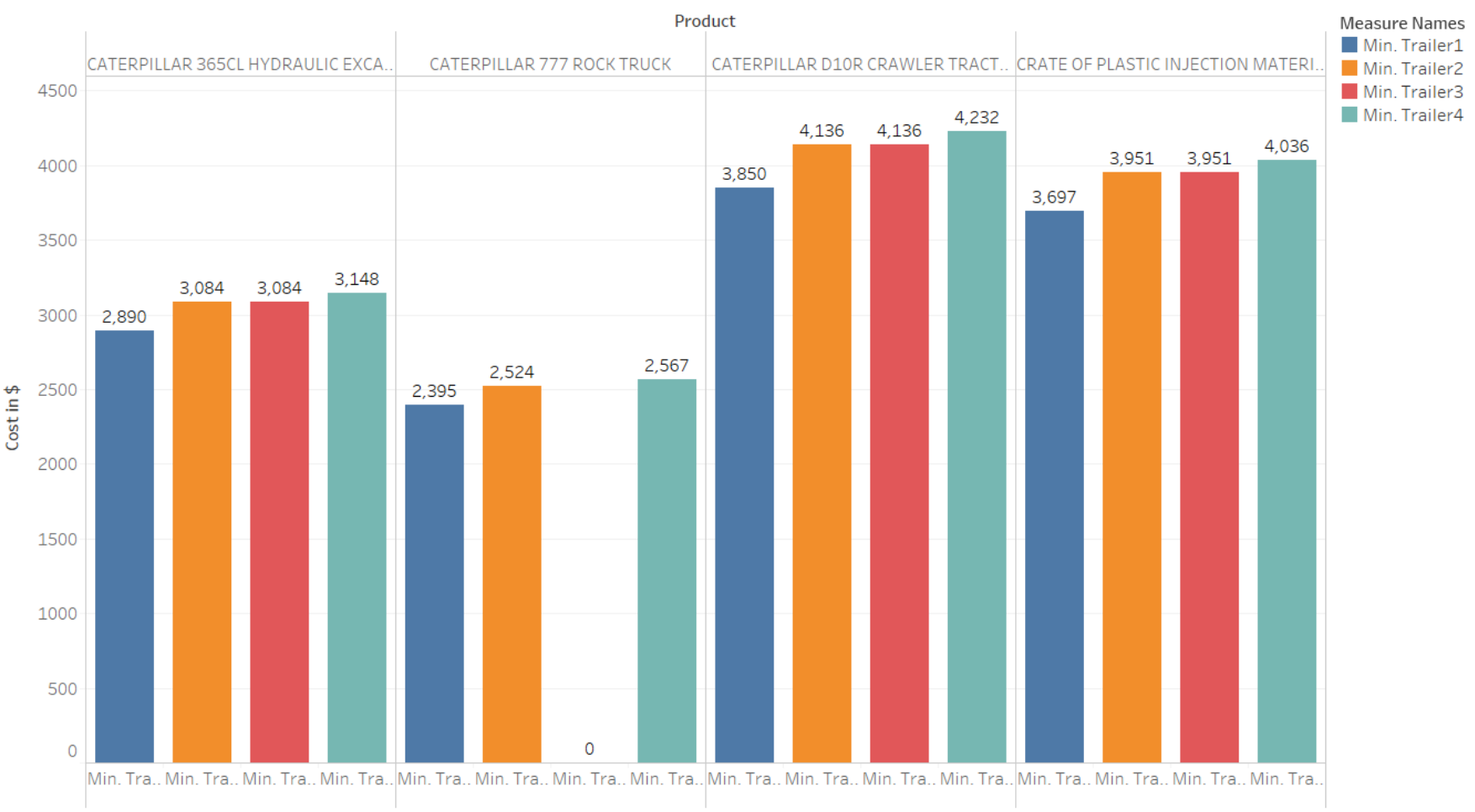
Distance



Map based on Longitude (generated) and Latitude (generated). Color shows details about Path. Size shows details about Distance. Details are shown for Source City.

Trailers Cost Comparison

Cost Comparison

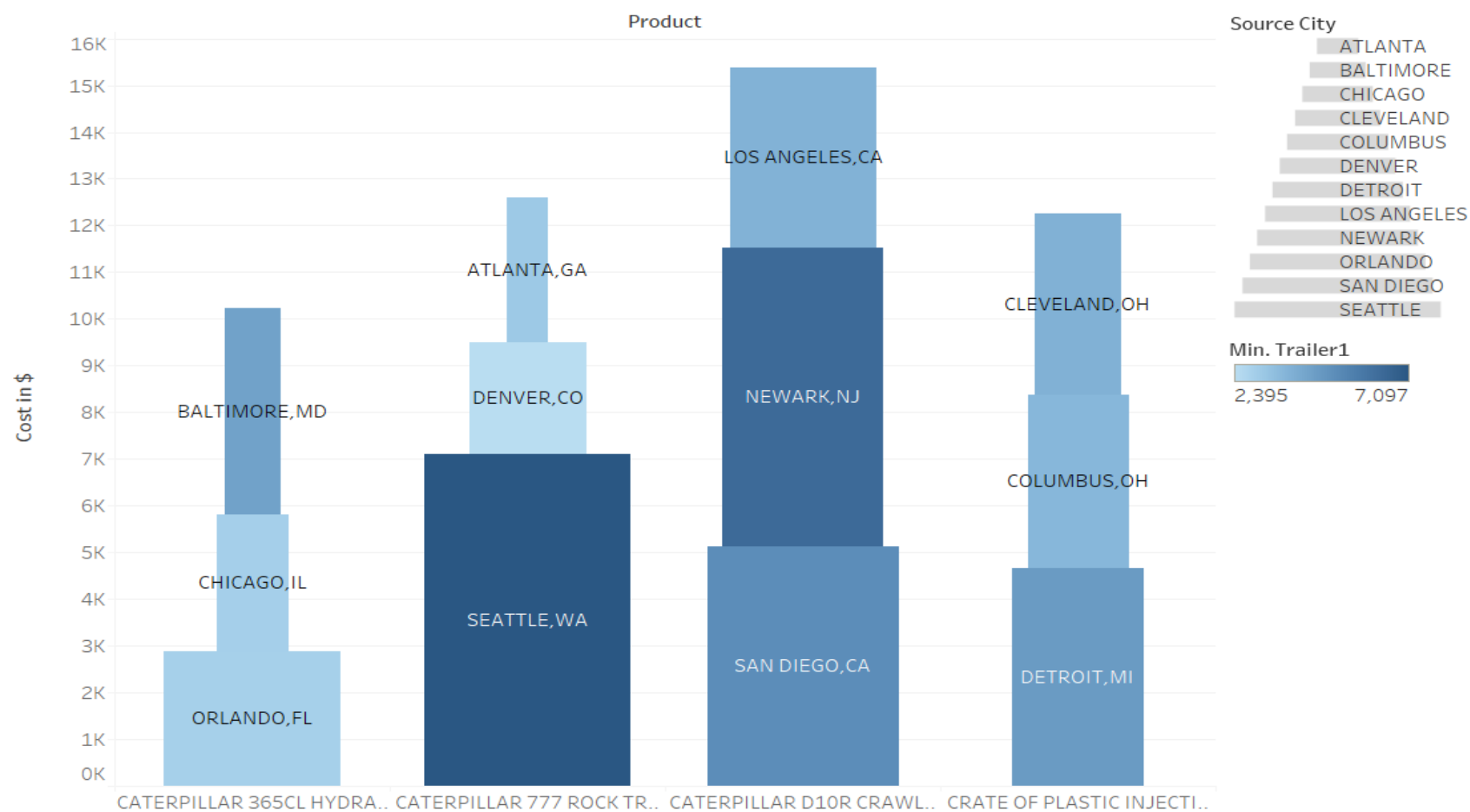


Min. Trailer1, Min. Trailer2, Min. Trailer3 and Min. Trailer4 for each Product. Color shows details about Min. Trailer1, Min. Trailer2, Min. Trailer3 and Min. Trailer4. The marks are labeled by Min. Trailer1, Min. Trailer2, Min. Trailer3 and Min. Trailer4.



Trailer 1 Cost Comparison

OTR



Minimum of Trailer1 for each Product. Color shows minimum of Trailer1. Size shows details about Source City. The marks are labeled by Location. The view is filtered on Exclusions (Product,Source City), which keeps 12 members.

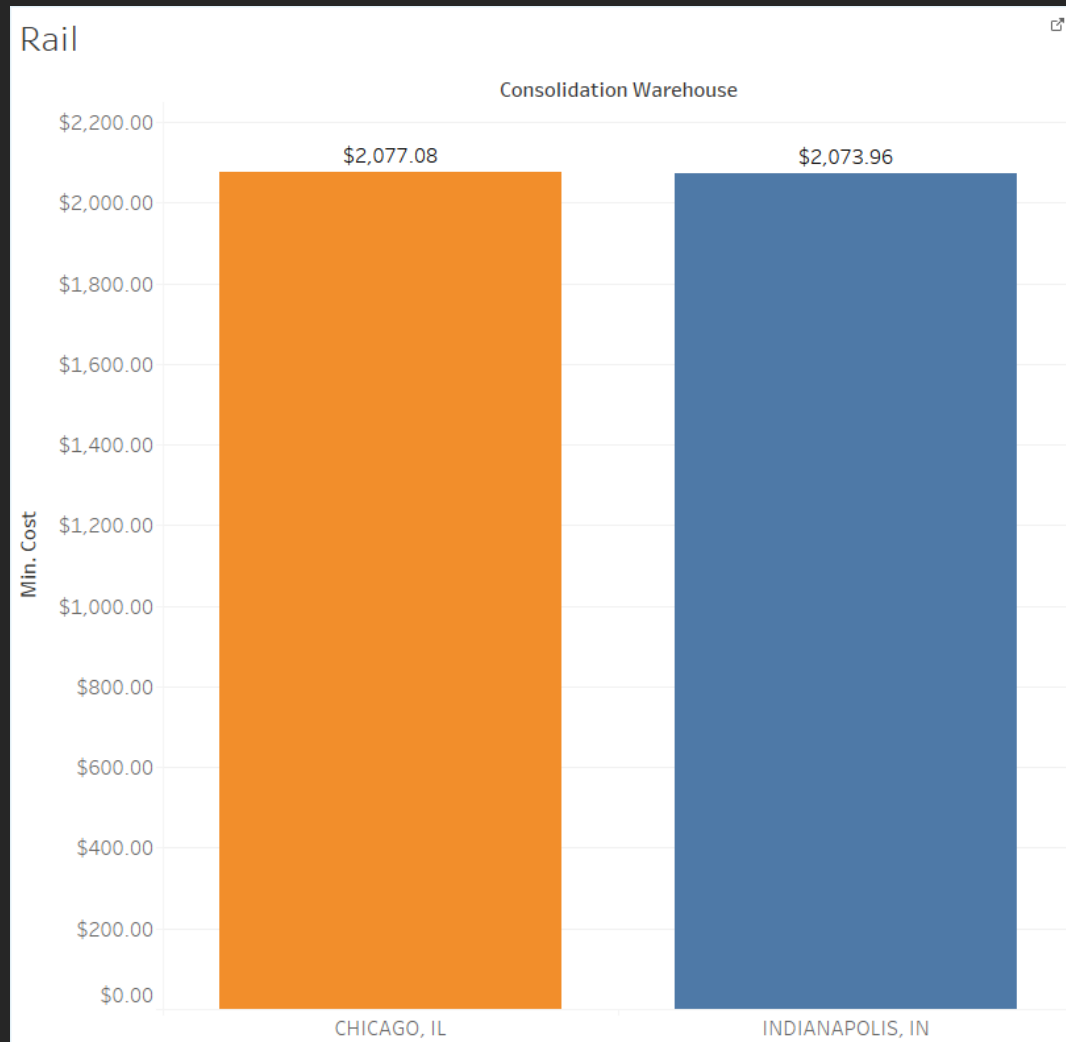


RAIL

- Drayage - Miles has been calculated from consolidation warehouse to vendor 1 and from vendor 1 to vendor 2.
- Then for the delivery from San Antonio to Dallas. Road Transportation cost is then calculated using the miles and OTR rates.
- Rail transportation is separately given for 2 locations.
- Using this total transportation cost for the product CATERPILLAR C3000 FORKLIFT has been found out.



RAIL



AIR

- Using the dimension, cost of the carriage is calculated.
- The total cost for air transportation would thus take into account the carriage cost, transit cost and transportation cost to and from the respective airports.



AIR



FINAL INSIGHTS

- *Based on the gained Insights, we decided to use Trailer 1 in terms of cost and optimization.*
- *Also, for CRATE OF PLASTIC INJECTION MATERIAL we decided to use AIR transportation as it is less cost and faster. We decided to air transport from Columbus, even though Cleveland is cheaper, it takes 3 days.*
- *There is no delay in delivering the products*



Product	LOCATION	#Days	Cost	Mode
CATERPILLAR 365CL HYDRAULIC EXCAVATOR	BALTIMORE,MD	2	\$2,890	OTR
CATERPILLAR D10R CRAWLER TRACTOR	LOS ANGELES,CA	2	\$3,850	OTR
CATERPILLAR 777 ROCK TRUCK	ATLANTA,GA	2	\$2,395	OTR
CATERPILLAR C3000 FORKLIFT	INDIANAPOLIS, IN	2	\$2,073.96	RAIL
CRATE OF PLASTIC INJECTION MATERIAL	COLUMBUS, OH	2	\$3,390	AIR



*Thank
You...!!!*