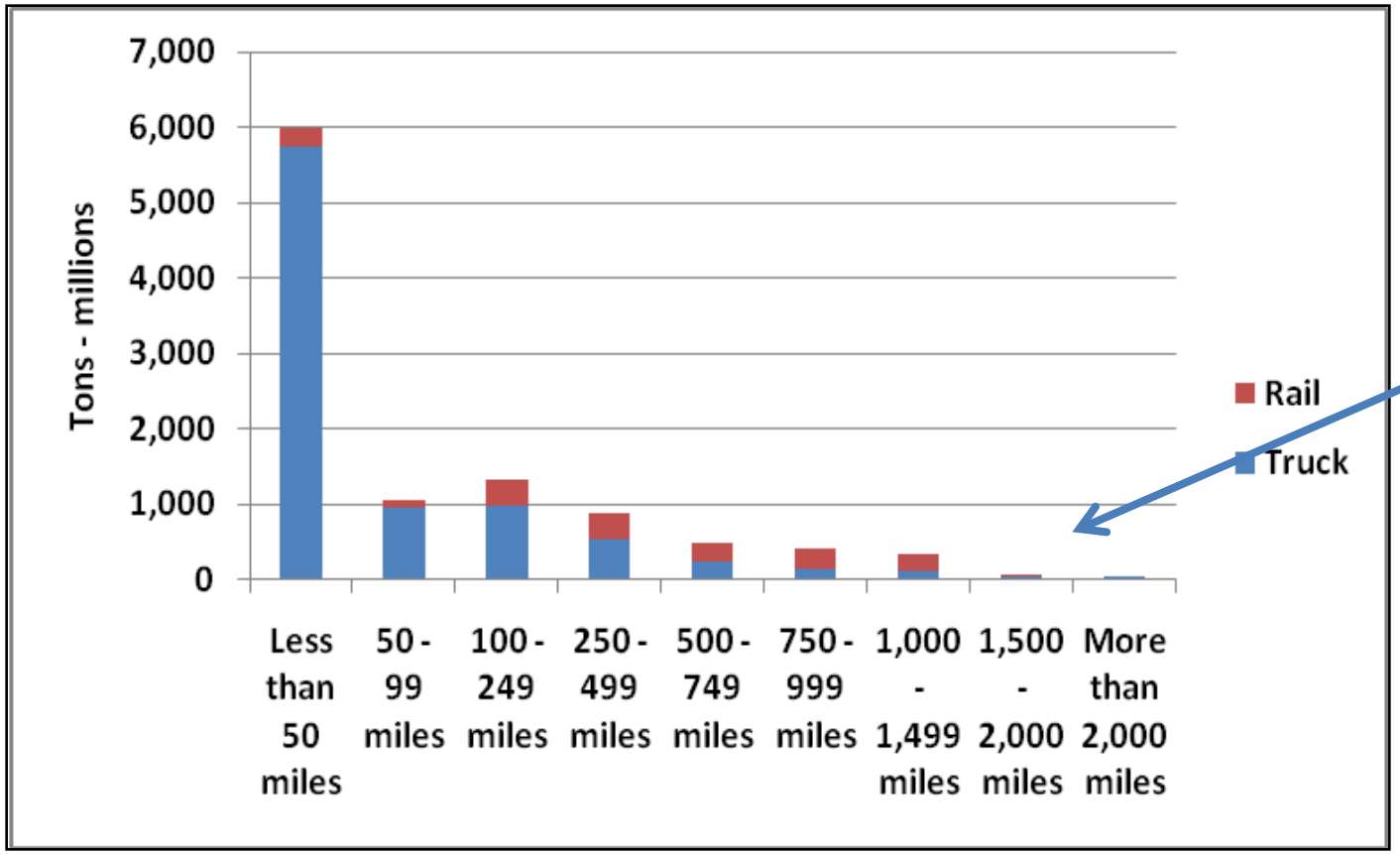
Background to Research

- 'Higher' speed passenger trains (up to 110 mph) are being increasingly discussed
- Amtrak's experience shows that there is not a safe (when empty) freight car truck for speeds over 70 mph
- FRA is funding research for freight car trucks that are deemed safe up to 125 mph
- Sharma and Associates, Inc. awarded contract to design and develop a higher speed truck, which they did, and they subsequently hired David Burns to jointly develop a business case for justification for funding further testing and development

Is there a Business Case for Higher Speed Freight?

- In the 1930s there were very profitable mail and express trains that were operated at passenger train speeds
- This traffic shifted to air, road and intermodal
- Today railroad intermodal operates at only 50 to 60% of today's passenger train speeds
- Many shippers, especially for longer distances, need faster services so they make use of team driven trucks and even air
- Only a limited volume of freight can justify the extra cost of higher speed delivery, on inventory cost alone

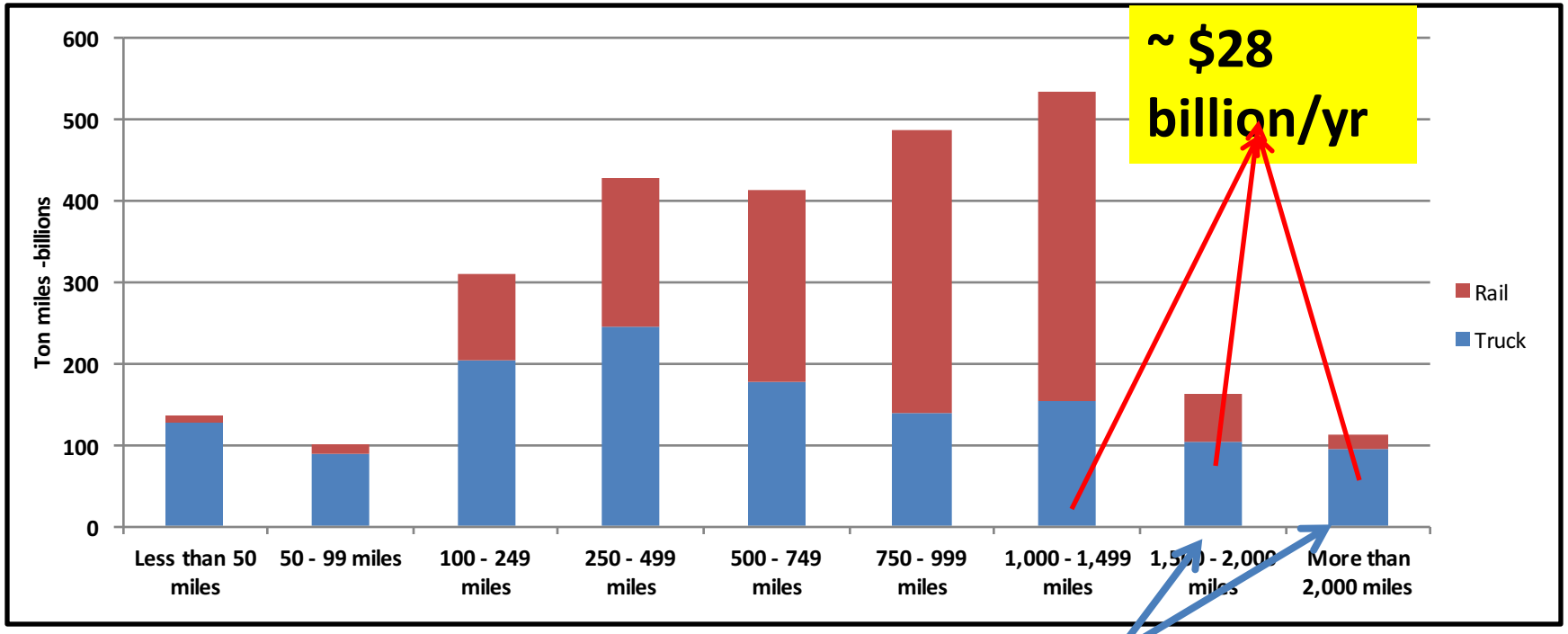
U.S. Rail and Truck tons by length of haul



In terms of tons volume is small

Source: 2007 Commodity Flow Survey

Rail and Truck Ton Miles

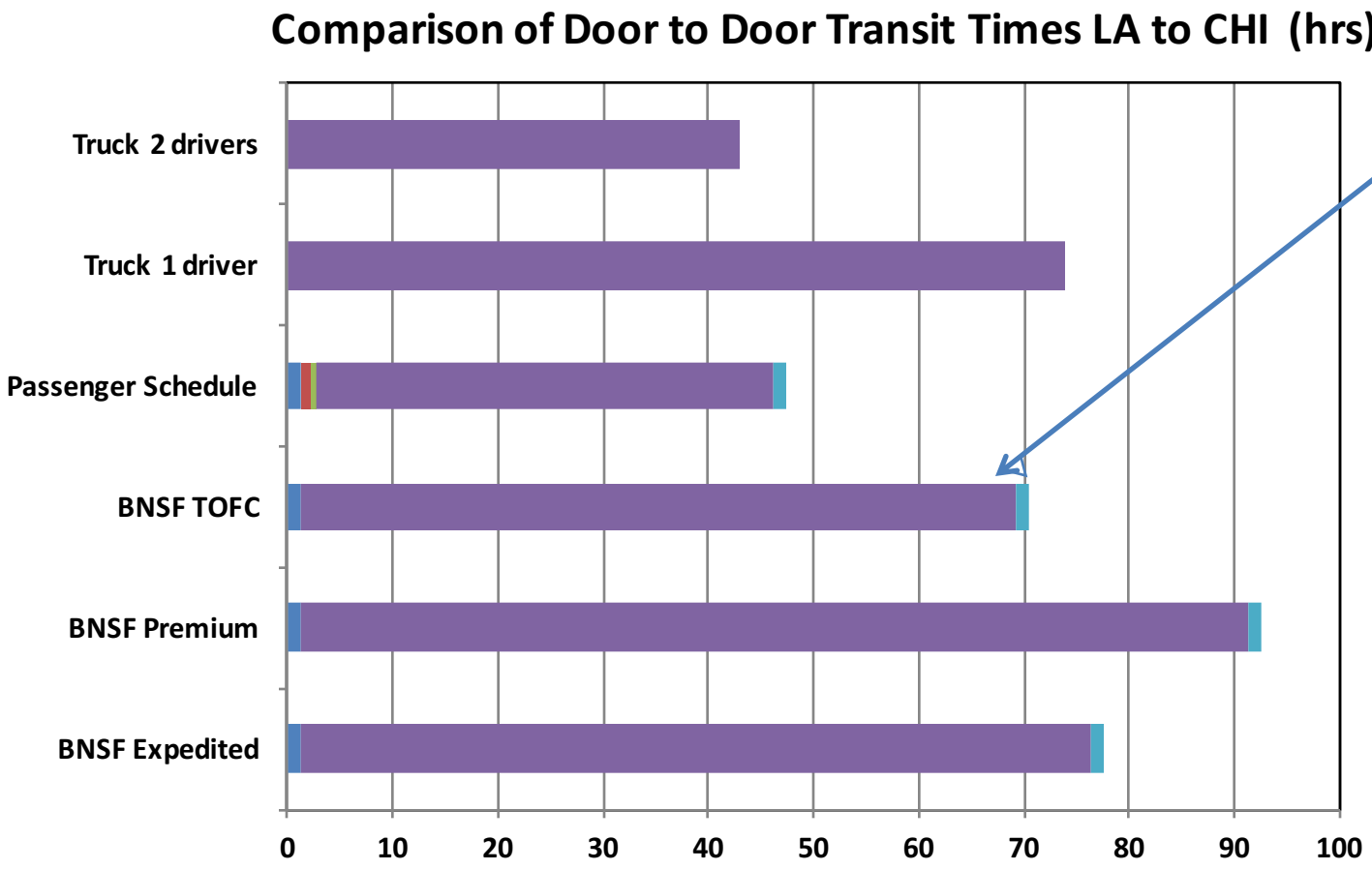


2007 Commodity Flow Survey

Above 1,500 miles rail is only 27% and above 2,000 miles 15%

A large percentage of shippers are prepared to pay 2 to 3 times rail for the better service and the speed of trucks

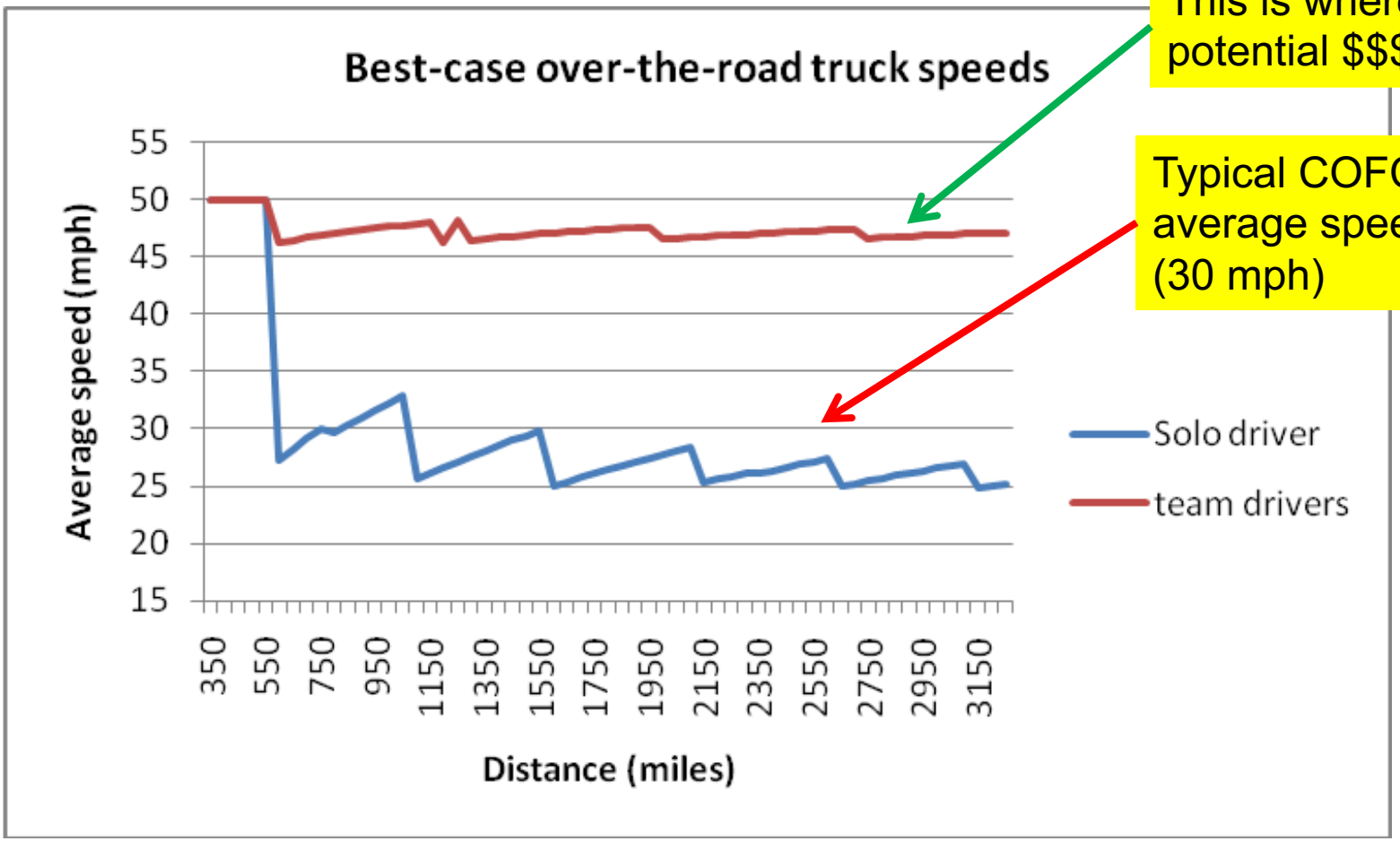
Example of Comparative Speeds



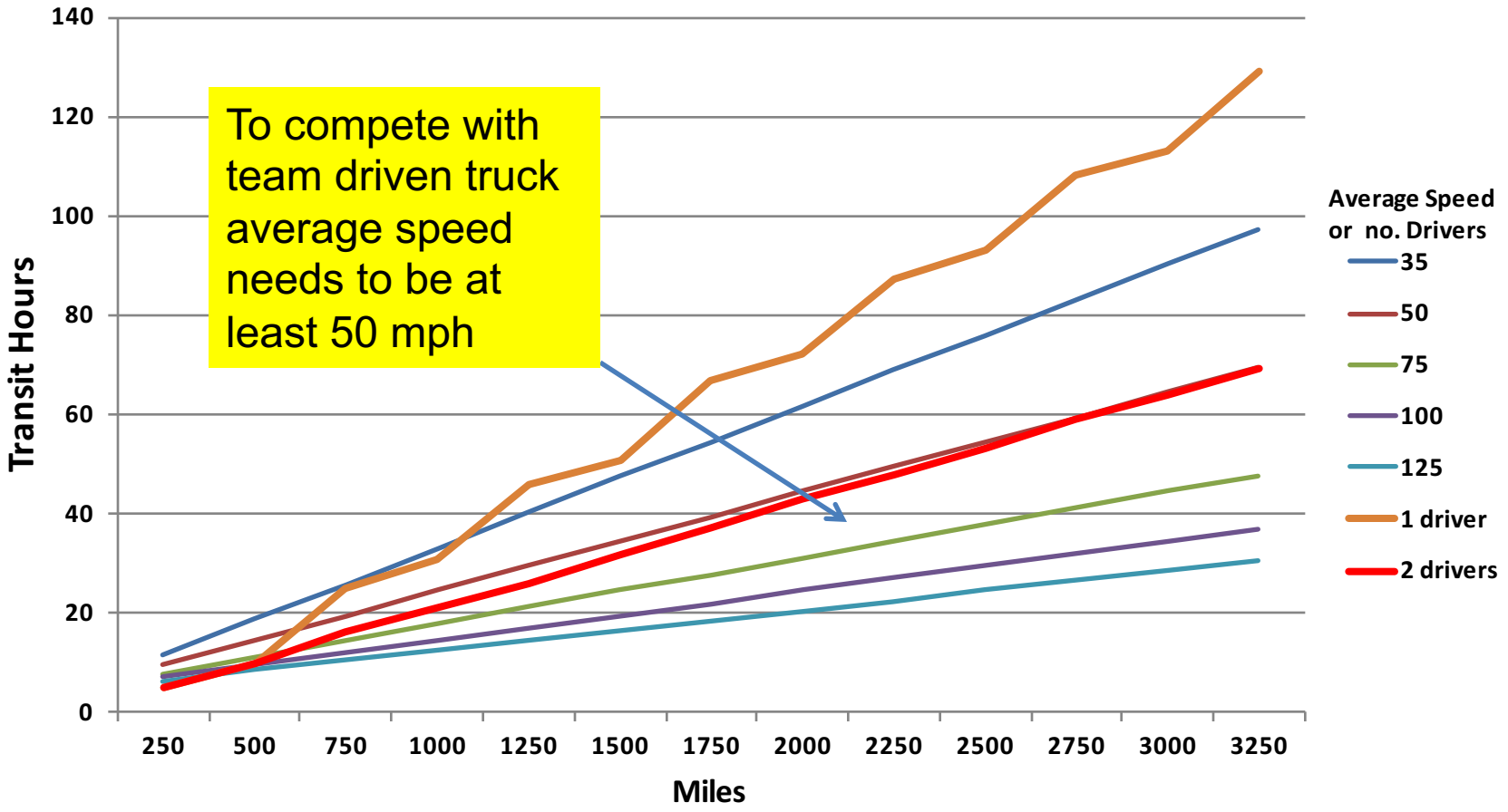
Why is TOFC so much slower than Amtrak?

COFC Seattle-Chicago on Union Pacific 50% slower than Amtrak

How Fast is Trucking



Long Distances Speed Comparison



Consumption of Food and Beverages with Rail Share of Transportation (2004)

Food Group	Domestic Usage	Exports	Railroad Tonnage	Railroad Share by Car Type					
	tons million			Boxcar	Covered Hopper	Refrig. Boxcar	TOFC/ COCF	Tank	Total RR Percent
Red Meat	16.35	2.86	1.29			3.0%	0.8%	2.9%	6.7%
Poultry	9.90	2.75	0.80			5.6%	0.5%	0.2%	6.3%
Fish	2.15		0.13			3.9%	2.1%		6.0%
Dairy Products	85.89		0.94	0.3%		0.6%	0.2%		1.1%
Fats and Oils –	13.28	2.9	11.04		0.3%	0.1%	0.6%	67.3%	68.2%
Fruit, Fresh	18.40		0.62	0.5%	0.1%	2.3%	0.5%		3.4%
Fruit, Processed	20.85		0.78	0.5%		2.0%	1.2%		3.8%
Veg., Fresh	28.19		1.95	1.1%	1.1%	1.4%	3.3%		6.9%
Veg., Processed	32.35		0.26	0.0%	0.2%	0.4%	0.2%	0.0%	0.8%
Flour and Cereal	28.01		10.84	5.3%	29.4%	1.7%	2.3%	0.0%	38.7%
Caloric Sweeteners	20.54	0.5	15.73	1.2%	17.6%	1.3%	0.5%	54.0%	74.8%
Sub Total	275.91		44.37						16.1%
Beverages									
Beer	25.30		7.28	10.3%		14.6%	1.8%	2.1%	28.8%
Wine	2.40	0.3	1.79	2.4%		31.1%	32.8%		66.3%
Liquor	1.41	0.2	0.71				33.0%	11.2%	44.2%
Soda	69.22		0.44				0.6%		0.6%
Sub Total	98.33		10.22						10.4%

~ 6 million tons in reefers or COFC/TOFC

Today ~ 10 million tons about 10%

~ 10 million tons in reefers or COFC/TOFC

Source: U.S. Dept. of Agriculture 2004 and STB Carload Waybill Sample

Cold Chain is a Necessity!

Common Name	Storage Temp. F	Relative Humidity %	Highest Freezing Temp. F	Ethylene production	Ethylene sensitivity	Approx. storage-life
Apple-not chill sensitive	30-32	90-95	29.3	VH	H	3-6 months
Apple-chill sensitive	40	90-95	29.3	VH	H	1-2 months
Apricot	31-32	90-95	30	M	M	1-3 weeks
Arugula	32	95-100		VL	H	7-10 days
Asparagus	36	95-100	31	VL	M	2-3 weeks
Avocado-Fuerte, Hass	37-45	85-90	29.1	H	H	2-3 weeks
Avocado-Fuchs, Pollard	55	85-90	30.4	H	H	2 weeks
Avocado-Lula, Booth	40	90-95	30.4	H	H	4-8 weeks

~ 200 separate categories

Mix and match produce is a necessity

Estimate of Annual Tonnage of Fruits and Vegetables Consumed by Location

Basically 3 major corridors

Destination Locations	Percent Population	Originating Annual Tonnage	
		West & SW	Florida
Northeast	23.0	5,092,706	552,161
Midwest	17.5	3,874,885	420,123
Southeast	21.4	4,738,431	
Total Daily 'Truck' loads Consumed			
Northeast		728	79
Midwest		554	60
Southeast		677	

Typical New York Prices

Produce	Cost per lb	Market price per ton
Orange Juice	$3 (4 lb – half gal.)	$1,500
Strawberries	$2.50	$5,000
Processed Lettuce	$4.00	$8,000
Herbs and Raspberries	$15.00	$30,000
Avocados	$3.30	$6,600
Potatoes	$0.80	$1,600

Some produce can pay for high transport costs

Note: FOB prices are approximately 30% of retail prices.

How can Railway Compete with Team Driven Trucks?

Comparison of field-to-distribution center for shipping from California to Northeast by rail and road

	Rail Current times hrs			Passenger Train ~ 54 mph	Priority Freight Train ~ 59 mph	Single Driver	Team Drivers
	Low	High	Average				
Field to packing shed	0.5	3	1.5	1.5	1.5	1.5	1.5
Packing Shed	3	2160	8	4	4	4	4
Transport to Consd. Facility	1	36	8	8	4		
Consolidation Facility	5	36	24	12	5		
Rail or Road Transit	100	124	112	60	55	129	69
Rail Transload Facility	5	36	24	12	5		
Transit to Distribution Center	0.25	48	8	8	8		
Wholesale Distribution Center	4	24	8	8	4		4
Total Hours (after packing shed)	115.25	304	184	108	81	134.5	78.5
Total Days (after packing shed)	4.8	12.7	7.7	4.5	3.4	5.6	3.3

Revenue per Freight Car Based on Cost of Trucking

	Average shelf life	% by weight	Truck charge $	Handling discount	Truck loads/car	Rev./ 55 car train
Category 1 (Berries, lettuce, etc)	8 days	15%	10000	20%	2.5	165000
Category 2 (Leaf veg, oranges, etc)	14 days	45%	7500	20%	3.5	519750
Category 3 (Root veg., apples, etc)	28 days	40%	6000	20%	4.0	422400
Potential avg. revenue per Car $						20130
Revenue per 55 car train $						$1,107,150

Value of additional freshness

	Cars per train	Truck loads per train	Potential additional $	Potential Rev./Train
Category 1 (Berries, package lettuce)	8.25	20.6		0
Category 2 (Leaf veg, oranges, etc)	24.75	86.6	1500	129938
Category 3 (Root veg., apples, etc)	22	88.0	1000	88000
Additional Revenue/55 car train $				$217,938

Rail Potential Revenue from Produce ~ $330/train mile

Total Daily 'Truck' loads Consumed/day	From West and SW	From Florida	Average Car Loads/day	Rev/Car	Annual Rev.
Northeast	728	79	205	20000	$1,435,000,000
Midwest	554	60	156	14000	$764,000,000
Southeast	677	0	191	14000	$934,000,000
					$3,133,000,000

If backhaul is empty revenue ~$280/train mile

Probably not sufficient for dedicated train

Originating from W and SW only considered

Freshness Value

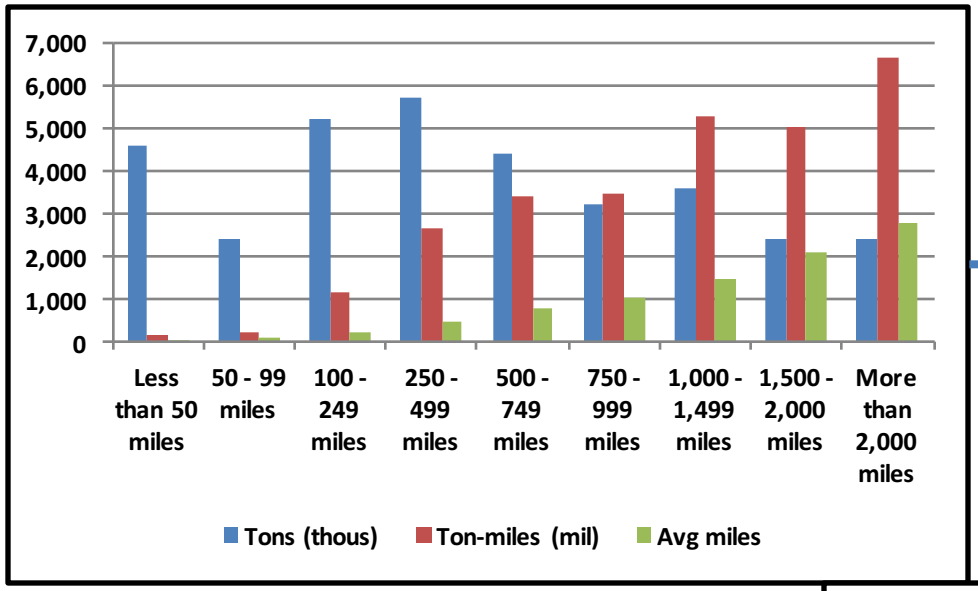
	Average Car Loads/day	Ave. Value time savings	Annual $ for Shelf Life
Northeast	205	4000	$287,000,000
Midwest	156	2600	$142,000,000
Southeast	191	2600	$174,000,000
			$602,000,000

Could be added to annual revenue

Produce Summary

- Rail transit time must compete with team driven trucks
- Operating as second section to passenger train minimizes train path interference
- Must be able to consolidate and mix produce
- Higher speed freight takes advantage of competitive speed and car weight capacity
- 300+% increase in freight car utilization
- Only about 10% of produce currently shipped by rail
- Annual revenue potential could be as high as $3.7 billion

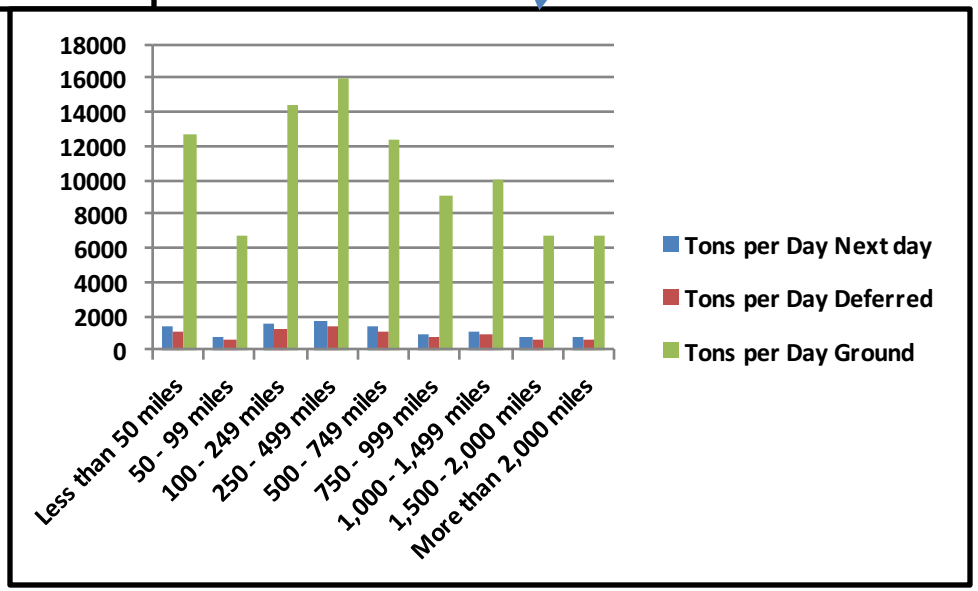
Package and Courier Service



Source: Commodity Flow Index

Service Type	Packages ('000)	%
Next Day Air	1205	9%
Deferred	941	7%
Ground	11140	84%
Total daily volume	13286	

Source: UPS



34 million tons per year but there are problems

Package and Courier Service

	Tons per Day		
	Next day	Deferred	Ground
Less than 50 miles	1366	1062	12746
50 - 99 miles	719	559	6712
100 - 249 miles	1551	1206	14473
250 - 499 miles	1712	1331	15974
500 - 749 miles	1322	1028	12340
750 - 999 miles	971	755	9058
1,000 - 1,499 miles	1082	842	10102
1,500 - 2,000 miles	723	562	6745
More than 2,000 miles	725	564	6770
	6535	5082	60990

Source: UPS

Team driven truck tonnage is small in weight but larger in volume

Corridors	% Population On Corridor	Traffic Percentage	Distance miles	National Tons/day	Trucks/ Day UPS only	Comments
NE-SE	44.4	23%	750 to 999	764	55	Tunnels will restrict to single stack and will not go through Atlanta
MW-SE	38.9	20%	1000 -1499	852	61	
SW-SE	34.8	18%	1500-2000	569	41	Will not go through Dallas
SW-MW-NE	53.9	27%	<2000	571	41	Must go through Chicago
Other	24.7	13%				Probably does not warrant train.

Package and Courier Service

	Low	Average	High	Passenger Train	Priority Train 65 mph	Single Driver	Team Drivers
Drayage	0.25	0.5	2.5	0.5	0.25		
Wait	0.1	0.5	3	0.5	0.1		
Load	0.1	0.25	0.5	0.25	0.1		
Transit				60	55	129	61
Unload Average	0.1	0.5	0.5	0.5	0.1		
Drayage	0.25	0.5	2.5	0.5	0.25		
Total Time hrs				62.25	55.8	129	61

COFC /TOFC speed based on single driver

For package and courier service there appear to be four major long distance traffic lanes:

- Los Angeles to New York via Chicago
- New York to Florida, via Atlanta (Based on passenger train routes this currently is not yet available by rail)
- Los Angeles to Dallas (There is currently no direct passenger train route)
- Atlanta to Dallas (Currently not a passenger train route).

Train Distance miles	3250		
Revenue/Container			
Deferred $	9000		
Ground $	6000		
Train Length (cars)	25	50	75
Total Containers	50	100	150
Deferred	20	20	20
Ground	30	80	130
Deferred Revenue	180000	180000	180000
Ground Revenue	180000	480000	780000
Train Revenue	360000	660000	960000
$ per train mile	110.77	203.08	295.38

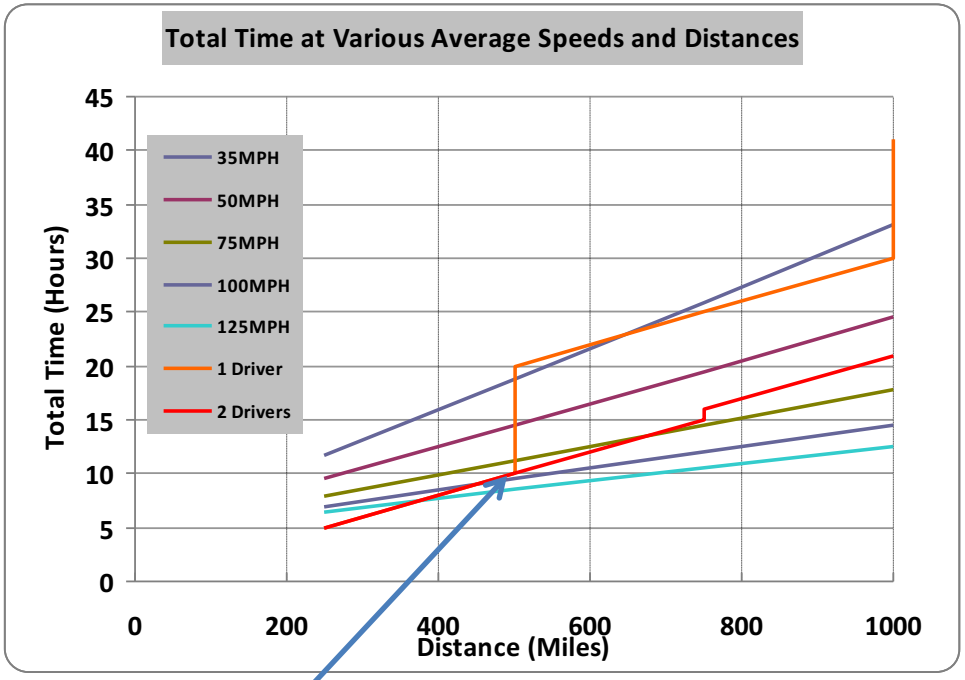
Would probably require minimum 50 car trains

Package and Courier Service-Summary

- ‘Ground’ service business required to fill the train
- What would be the value of faster ‘ground’ service?
- Service demand varies by day of week
- Lends itself to double stack
- Hub and spoke could be a problem
- Identified annual revenue ~ $54 million

Interested in rail but how?

Opportunity and Problems of Short Distances



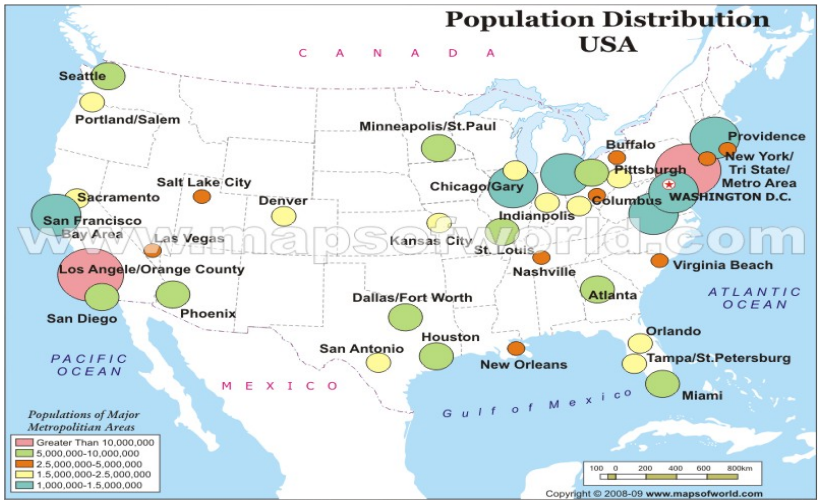
Up to 500 miles trucks are faster even for rail at 100 mph

Extend the Canadian Pacific Expressway approach

Under 500 miles rail must be integral part of logistics chain, such as overnight and higher speeds makes additional city pairs possible

Short Distance Summary

- 6 pairs of U.S. cities have a potential
- San Francisco - Los Angeles
- Atlanta – Central Florida
- Atlanta – Richmond/Washington
- Chicago – Minneapolis
- Chicago – Kansas City
- Chicago – Pittsburgh
- Washington – Boston (likely not feasible because of the limitations of the North and East River Tunnels at Penn. Station New York).
- Potential annual revenue $150 to $250 million

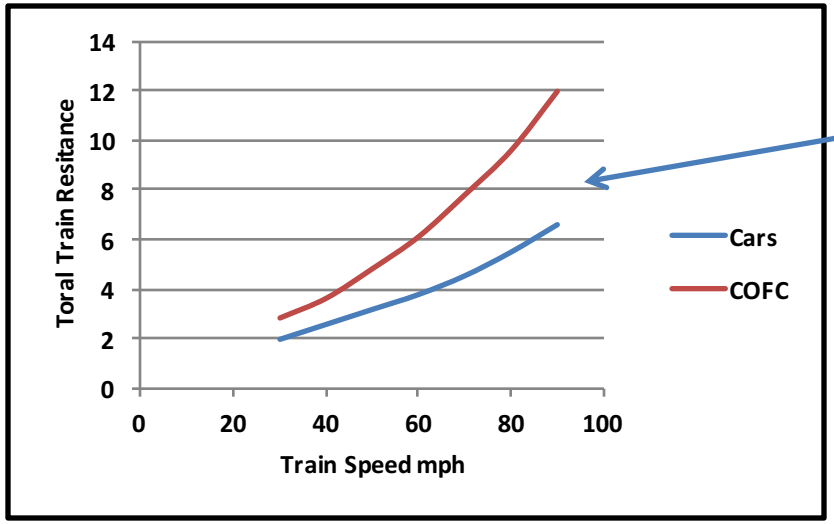


Higher Speed Intermodal

- Intermodal trains today operate at single driver speeds or slower
- Manifest freight generally cannot justify higher train speeds
- Less Truck Load (LTL) range from 150 lbs to 5 tons, average 1200 lbs, about 250 million tons/year
- About 15% demand for premium service, with 20% higher price
- Majority will be containerized
- SW – NW LTL demand is for 2.5 trains/day
- A single train a day with a 40% premium, filling rest with economy, 6 trains per week each way is may be financially viable
- Annual revenue on higher speed trains $318 million, of which at least $140 million will be additional revenue
- May require double stacks, higher speed may be difficult

Cost of Going Faster

(Average of 60 mph compared to 30 mph)



Source: University of Illinois

At higher speeds cars are more cost effective per ton of capacity than containers

Higher speed trains can be 34% more expensive

	Class 1	Increase in Cost		Higher Speed Cost	
Catigories of Expense	Average	Cars	COFC	Cars	COFC
Transportation w/o fuel	25%	0%	0%	25	25
Fuel	20%	90%	118%	38	43.6
Equipment	25%	49%	98%	37.3	49.4
Track	18%	20%	25%	21.6	22.5
General and Admin	12%	0%	0%	12	12
	100%			133.9	152.5
Estimate % increase in cost				33.9	52.5

Source: average cost percentage AAR and University of Illinois

Line Capacity Considerations

- Faster trains haul higher-rated freight and are more profitable, allowing the sacrifice of some slow-freight capacity without financial penalty
- 70 mph passenger train requires ~three (3) 50 mph train paths
- Second section to passenger train only requires 0.5 to 1 additional train paths
- Computerized dispatching will reduce capacity problem and increase overall speed
- Lapped sidings would be an advantage

Line Capacity Costs

Revenue and expense per 'Average' train mile

Freight Revenue/Freight-train-mile:	$ 118.32
Freight Service Expense/Freight-train-mile:	$ 89.37
Freight Operating Income/Freight-train-mile:	$ 28.95
Freight Service Expense/Freight Revenue Ratio:	75.5%

Source : AAR

If only one average freight displaced, operating income could be ~ $200/train-mile

Produce train revenue $280 to $330/ train mile

Courier and Package revenue ~$200+/train mile

LTL Intermodal revenue ~ $165/ mile

Revenue per train mile to offset lost train paths

"Average" freights displaced	Higher Speed Freight Cost Differential					
	0%	20%	40%	60%	80%	100%
0.5	$104	$122	$140	$157	$175	$193
1	$118	$136	$154	$172	$190	$208
2	$147	$165	$183	$201	$219	$237
3	$176	$194	$212	$230	$248	$266
4	$205	$223	$241	$259	$277	$295
5	$234	$252	$270	$288	$306	$323
6	$263	$281	$299	$317	$335	$352
7	$292	$310	$328	$346	$364	$381

The Freight Car Truck Question

- Railroads do not offer freight service at passenger train speeds or higher because there is no proven, safe and low maintenance freight truck that can be operated above 70 mph and 100+ tons
- For priority freight maximum speeds of 90 or 100 mph are needed
- Heavier axle loads and higher speeds dictate a track friendly truck that will probably require a primary suspension
- Higher speed freight car utilization will be 5 to 10 times a conventional fright car, so capital cost not significant
- North American freight car truck suppliers have limited interest in developing a higher speed, heavy axle load truck because the railroads are currently showing little, if any, interest

Potential of the Higher Speed Freight Car

- Could increase rail revenue by at least $4.5 billion/year
  - Produce $3.1 to $3.7 billion
  - Package and Courier at least $54 million
  - Higher Speed Intermodal ~$318 million
  - Short Distance intermodal $150 to $250 million
  - Long distance trucking, unidentified additional revenue, may be $5 to $10 billion a year
- Could increase annual operating income by about $2 billion
- Improvements in conventional freight car trucks
- Freight railroads could benefit from infrastructure required for 'higher' speed passenger train
- Will result in significant reduction of long distance truck traffic