

# Allocating Truck Yard Resources and Reducing Bobtail Miles

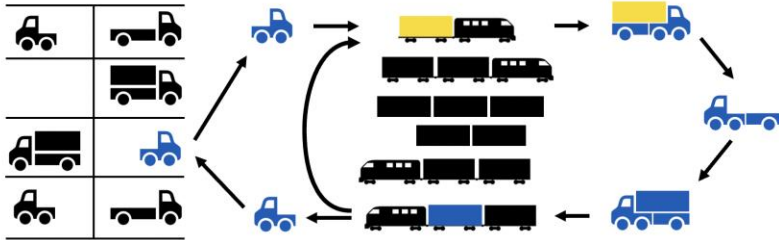


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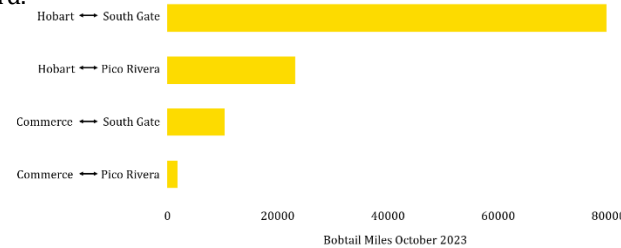
## J.B. Hunt Intermodal

J.B. Hunt Transport Services, Inc. is a Fortune 500 company specializing in multimodal services to provide streamlined shipping and carrier solutions. The Intermodal business unit ships between customers and the BNSF Railway, utilizing truck yards to domicile trucks and trailing equipment. Intermodal drivers begin and end their day driving 'bobtail' between truck yards and rail yards. Bobtailing occurs when no trailing equipment is attached to the cab (tractor) of a truck.



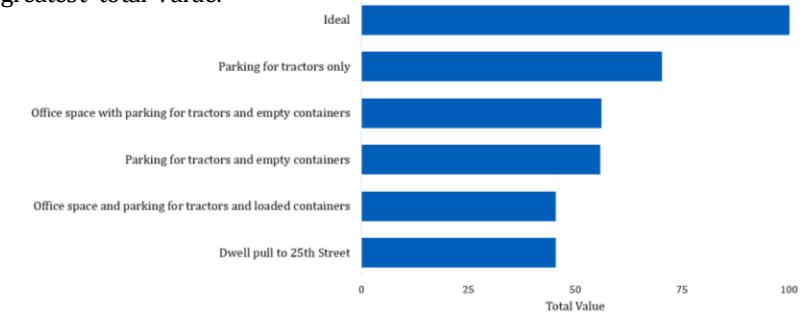
## Addressing Bobtail Miles

J.B. Hunt is concerned about the number of bobtail miles being driven because they consider bobtailing unproductive. Bobtailing incurs costs, such as fuel, driver wages, and equipment maintenance, without moving freight to generate revenue [1]. Using data provided by Brandon Workman and Jake Wofford, we determined that in October 2023, J.B. Hunt drove over 114,000 bobtail miles, costing over \$185,000. We developed an optimization model to create an ideal scenario where all bobtailing to and from the Hobart rail yard is assigned to the 25<sup>th</sup> Street truck yard.



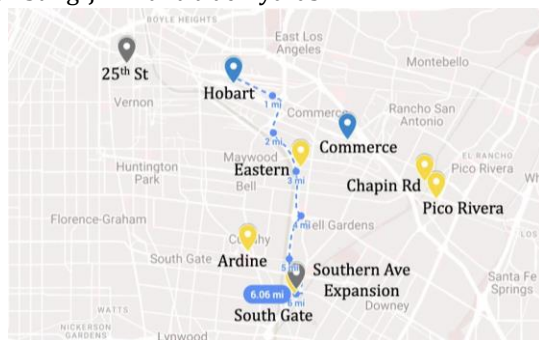
## Value of Alternatives

We created five alternatives for resource allocation at the new truck yards. We started with our solution from our simple optimization model: The 25<sup>th</sup> Street yard should contain enough tractors to meet the Hobart rail yard demand. We determined the other four alternatives through stakeholder analysis. The alternative allocating exclusively cabs to 25<sup>th</sup> Street and exclusively containers to the South Gate Expansion had the greatest total value.



## Truck Yard Allocation

J.B. Hunt has a network of 5 truck yards in Los Angeles, California. They recently purchased two new properties in this area, and our goal is to reduce bobtail miles by effectively allocating space for equipment at these yards. The new yard at 25<sup>th</sup> Street is closer to the primary rail yard than all the existing J.B. Hunt truck yards.



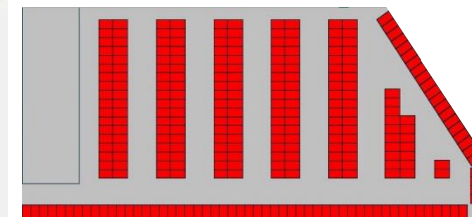
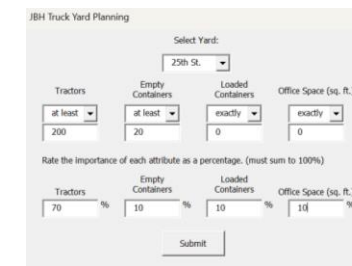
## Weight Analysis

We used a Multiple Objective Decision Analysis (MODA) model to determine how to allocate resources at the new truck yards. We identified four resources (tractors, empty and loaded containers, and office space) that influence space allocation through stakeholder analysis. We created value functions and a swing weight matrix to compare each resource. Then, we scored each factor and scaled them to sum to 1.

		Importance to JB Hunt		
		High	Medium	Low
Significance of the value measure range in the value function	High	Tractors	Trailers	
	Med		Containers	
	Low			Office Space

## Decision Support Tool

We explored a limited number of alternatives, so we developed a decision support tool in Microsoft Excel VBA. The tool allows users to adjust the swing weights to generate different resource allocations. The output recommends the amount of space to dedicate for each resource visually and by acreage. The output also estimates the total bobtail miles and the associated costs for the recommended allocation strategy.



[1] M. Pearson, "Deadhead Miles: What they cost and how to reduce them," Delivery Solutions, <https://blog.deliverysolutions.co/dead-head-miles> (accessed Oct. 30, 2023).