ICA 7: Aggregate Truck Shipments

ISE 453: Design of PLS Systems **Fall 2018**

This ICA continues with the same example from the previous ICA and has three questions that can be answered using the worksheet you create. This ICA should be submitted.

1. What is the monetary weight to ship the product FTL?

$$TC_{FTL} = f r_{FTL} d = n r d \quad (= w d, w = \text{monetary weight in \$/mi})$$

2. A second product is to be shipped with the same origin and destination, and each unit weighs 80 lb, occupies 15 ft3, and is valued at $1,000. Annual demand for the product is 30 tons, and its production and demand is constant throughout the year. The estimated inventory-carrying rate is 0.3. If the second product is shipped independent, should it be shipped FTL, TL, or LTL?

3. What is the savings in TLC if both shipments will always be shipped together on the same truck (with same shipment interval) instead of as separate independent shipments?

$$d_1 = d_2, \quad h_1 = h_2, \quad \alpha_1 = \alpha_2$$

$$f_{\text{agg}} = f_1 + f_2$$

$$s_{\text{agg}} = \frac{(\text{aggregate weight, in lb})}{(\text{aggregate cube, in ft}^3)} = \frac{f_{\text{agg}}}{\frac{f_1}{s_1} + \frac{f_2}{s_2}}$$

$$v_{\text{agg}} = \frac{f_1}{f_{\text{agg}}} v_1 + \frac{f_2}{f_{\text{agg}}} v_2$$

$$q_{TL}^* = \sqrt{\frac{f_{\text{agg}} r d}{\alpha v_{\text{agg}} h}}$$