# Module 02 – Transportation Modeling

| Row Labels | D0f6eec2 | D4364665 | D4cf8ef3 | D7cefff4 | D9661ca9 | Df4d06c4 |
|---|---|---|---|---|---|---|
| S01a3d4d | 0.15 | 0.19 | 0.05 | 0.19 | 0.05 | 0.13 |
| S6e0cec4 | 0.10 | 0.09 | 0.17 | 0.18 | 0.13 | 0.08 |
| S98e66d8 | 0.12 | 0.05 | 0.17 | 0.13 | 0.06 | 0.05 |
| Sff2d315 | 0.05 | 0.10 | 0.07 | 0.12 | 0.07 | 0.19 |

Decision Variables: Minimize sugar miles

$$0.15X_{15} + 0.19X_{16} + 0.05X_{17} + 0.19X_{18} + 0.05X_{19} + 0.13X_{110}$$

$$0.10X_{25} + 0.09X_{26} + 0.17X_{27} + 0.18X_{28} + 0.13X_{29} + 0.08X_{210}$$

$$0.12X_{35} + 0.05X_{36} + 0.17X_{37} + 0.13X_{38} + 0.06X_{39} + 0.05X_{310}$$

$$0.05X_{45} + 0.10X_{46} + 0.07X_{47} + 0.12X_{48} + 0.07X_{49} + 0.19X_{410}$$

Objective Function: I17

| $ | 102.25 |
|---|---|

Capacity Constraints:

$X_{15} + X_{25} + X_{35} + X_{45}$ <=123

$X_{16} + X_{26} + X_{36} + X_{46}$ **<=120**

$X_{17} + X_{27} + X_{37} + X_{47}$ **<=113**

$X_{18} + X_{28} + X_{38} + X_{48}$ **<=118**

$X_{19} + X_{29} + X_{39} + X_{49}$ **<=119**

$X_{110} + X_{210} + X_{310} + X_{410}$ **<=120**

**Supply Constraints**

**X_15+X_16+X_17+X_18+X_19+X_110 =147**

**X_25+X_26+X_27+X_28+X_29+X_210= 103**

**X_35+X_36+X_37+X_38+X_39+X_310= 192**

**X_45+X_46+X_47+X_48+X_49+X_410=186**

## Model Optimized for Profit

*Implement your formulation into Excel and be sure to make it neat. This section should include:*

- *A screenshot of your optimized final model (formatted nicely, of course)*
- *A text explanation of what your model is recommending*

| LOCATIONS | D0f6eec2 | D4364665 | D4cf8ef3 | D7cefff4 | D9661ca9 | Df4d06c4 | Shipped | Sugar |
|---|---|---|---|---|---|---|---|---|
| S01a3d4d | 27 | 120 | 0 | 0 | 0 | 0 | 147 | 147 |
| S6e0cec4 | 0 | 0 | 0 | 103 | 0 | 0 | 103 | 103 |
| S98e66d8 | 79 | 0 | 113 | 0 | 0 | 0 | 192 | 192 |
| Sff2d315 | 0 | 0 | 0 | 15 | 51 | 120 | 186 | 186 |
| **Received** | 106 | 120 | 113 | 118 | 51 | 120 | | |
| **Capacity** | 123 | 120 | 113 | 118 | 119 | 120 | | |
| | | | | | Total Distance in (sugar-miles) | | | $ 102.25 |

Throughout the model created, it is observed the accuracy for some demand in products and some who met the capacity requirements. We could have increased the

capacity in where there is actual demand. Instead of holding inventory cost for those who had received more sugar than actual demand for it.

=SUMPRODUCT(B3:G6,B10:G13)

## Model with Stipulation

*Please copy the tab of your original model before continuing with the next part to avoid messing up your original solution. What happens if you add an additional constraint to the model such that all demand MUST be met. Is the solution still feasible? If not, please explain why.*

*I think the solution is not feasible because of shipping constraints, it will have to change as well in order to fulfill demand.*

*Additional constraint?*

| LOCATIONS | D0f6eec2 | D4364665 | D4cf8ef3 | D7cefff4 | D9661ca9 | Df4d06c4 | Shipped | Sugar | |
|---|---|---|---|---|---|---|---|---|---|
| S01a3d4d | 27 | 120 | 0 | 0 | 0 | 0 | 147 | 147 | |
| S6e0cec4 | 0 | 0 | 0 | 103 | 0 | 0 | 103 | 103 | |
| S98e66d8 | 79 | 0 | 113 | 0 | 0 | 0 | 192 | 192 | |
| Sff2d315 | 0 | 0 | 0 | 15 | 51 | 120 | 186 | 186 | |
| **Received** | 106 | 120 | 113 | 118 | 51 | 120 | 628 | SUM OF SHIPPED | |
| **Capacity** | 123 | 120 | 113 | 118 | 119 | 120 | 713 | SUM OF DEMAND | |

**What is being shipped is less than the demand for the product.**

**Solver could not find a feasible solution.**

Solver can not find a point for which all Constraints are satisfied.