

Modelling LP: A production Model



Make vs. Buy Decisions: The Electro-Poly Corporation

- Electro-Poly is a leading maker of slip-rings.
- A \$750,000 order has just been received.

	Model 1	Model 2	Model 3
Number ordered	3,000	2,000	900
Hours of wiring/unit	2	1.5	3
Hours of harnessing/unit	1	2	1
Cost to Make	\$50	\$83	\$130
Cost to Buy	\$61	\$97	\$145

 The company has 10,000 hours of wiring capacity and 5,000 hours of harnessing capacity.

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Defining the Decision Variables

- M_1 = Number of model 1 slip rings to make in-house
- M_2 = Number of model 2 slip rings to make in-house
- M_3 = Number of model 3 slip rings to make in-house
- B_1 = Number of model 1 slip rings to buy from competitor
- B_2 = Number of model 2 slip rings to buy from competitor
- B_3 = Number of model 3 slip rings to buy from competitor

Defining the Objective Function

Minimize the total cost of filling the order. MIN: $50M_1 + 83M_2 + 130M_3 + 61B_1 + 97B_2 + 145B_3$

Defining the Constraints

Resource Constraints

 $2M_1 + 1.5M_2 + 3M_3 \le 10,000$ } wiring $1M_1 + 2.0M_2 + 1M_3 \le 5,000$ } harnessing

Demand Constraints

 $\begin{array}{ll} M_1 + B_1 = 3,000 & \} \mbox{ model 1} \\ M_2 + B_2 = 2,000 & \} \mbox{ model 2} \\ M_3 + B_3 = & 900 & \} \mbox{ model 3} \end{array}$

Nonnegativity Conditions
M₁, M₂, M₃, B₁, B₂, B₃ >= 0

Implementing the Model

	Electro	Electro-Poly Corporation			
	Slip Ring				
Number to	Model 1	Model 2	Model 3		
Make	3.000	550	900		
Buy	0	1.450	0		
Cost to					
Make	\$50	\$83	\$130	Total Cost	
Buy	\$61	\$97	\$145	\$453.300	
# Available	3.000	2.000	900		
# Needed	3.000	2.000	900		
Hours Required				Used	Available
Wiring	2	1,5	3	9.525	10.000
Harnessing	1	2	1	5.000	5.000

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