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## MEMORANDUM

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**TO:** MATT FORD  
**FROM:** BEN SCHULTZ  
**SUBJECT:** PROPOSAL OF EOQ ORDER SYSTEM  
**DATE:** 12/6/2006

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### Introduction:

This memo: (1) outlines the current inventory ordering process, (2) proposes a more cost efficient Economic Order Quantity (EOQ) system of ordering inventory, and (3) provides a comprehensive comparison between the current and the proposed EOQ systems. The proposed EOQ model identifies the optimal order quantity by minimizing the sum of certain annual costs that vary with order size.<sup>1</sup> Even if all the assumptions (listed below) of the EOQ model don't hold, it still represents the best indication of whether or not current order quantities are reasonable.<sup>2</sup>

### Summary:

- Under current policy, Crosset Company is ordering crates once a month at 800 crates per order resulting in Total Annual Cost (TAC) of \$1,736.
- Under the proposed EOQ policy, Crosset Company would order approximately twice a month at 392 crates per order resulting in Total Annual Cost (TAC) of \$1,372.
- It is recommended that Crosset initiate the proposed EOQ system to save \$364 per year (a 21% decrease in TAC).

### Analysis:

To determine the EOQ, a one must **trade off** two costs – (1) **inventory ordering costs** and (2) **inventory carrying costs**. Ordering costs are the expenses involved in placing a single order times the frequency of orders. The smaller the quantity per order, the greater the ordering costs, as more orders are being placed with suppliers. The fewer the orders placed, the lower the ordering costs, but the higher the average inventory, thus, higher inventory holding costs. Inventory holding costs include: storage space costs, handling costs, risk costs on inventory, inventory service costs, and capital costs.<sup>3</sup>

As mentioned above, Crosset Company currently orders crates once a month to meet the month's demand. In Graph 1, you will find the current ordering model and the proposed model outlined. The current cycle begins with 800 crates in inventory. As time approaches the end of the month, a new batch is ordered to fulfill the balance for the next cycle (or month). Under the EOQ Model, the beginning balance and batch order quantity is 392 crates, ordering twice a month, whereas, it's 800 under the current policy, ordering once a month. The starting inventory balances for each ordering cycle are quite different: the current model's beginning balance is twice as high as the proposed model. Here, in an effort to reduce the company's holding costs, the EOQ model optimizes the company's ability to distribute capital efficiently by lowering these beginning balances and establishes more frequent ordering.

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<sup>1</sup> Stevenson, William J. 2007. *Operations Management*. New York: McGraw-Hill/Irwin. p 550.

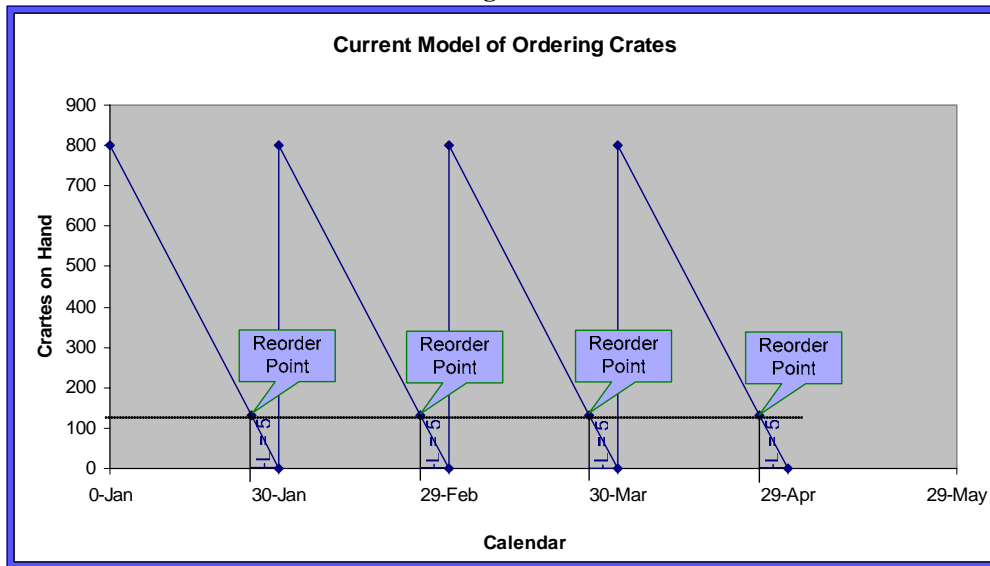
<sup>2</sup> Bozarth, Cecil. SCM: Inventory Management Models: Economic Order Quantity (EOQ) Model. <http://scm.ncsu.edu/public/inventory/6eoq.html>, November 2, 2006.

<sup>3</sup> Duft, Ken D. Inventory Management and Control. <http://www.agribusiness-mgmt.wsu.edu/ExtensionNewsletters/performance/InventoryMgmtControl.pdf>, November 5, 2006.

**Graph 1**  
**Comparison between Current and Proposed Models**

	<u>Current Model</u>	<u>EOQ Model</u>
Total Annual Cost (TAC)	\$1,736 <sup>4</sup>	\$1,372 <sup>5</sup>
Ordering costs (yearly)	\$336	\$672
Holding costs (yearly)	\$1,400	\$700
Days per cycle	30	15
Crates per order (Q*)	800	392 <sup>5</sup>

**Figure 1**



It is suggested that management at Crosset's management implement an EOQ policy for ordering crates, as EOQ theoretically and mathematically renders the lowest possible cost. After six months in practice, the progress of the EOQ policy should be reviewed. If this review is a favorable one, management should consider spreading the EOQ policy to different inventory items. Then, review again its progress against the rest of the inventory under the old policy. Over time, if the policy delivers a worthy outcome, perhaps, management would find it most cost efficient if the policy encompassed ordering patterns for all inventories.

<sup>4</sup> Current Scenario Computation

$$TAC = \left(\frac{D}{Q} * C_o\right) + \left(\frac{Q}{2} * C_H\right) = \left(\frac{9,600 * 28}{800}\right) + \left(\frac{800}{2} * 3.50\right) = \$1,736 \text{ yearly}$$

<sup>5</sup> EOQ Computation

$$TAC = \left(\frac{D}{Q} * C_o\right) + \left(\frac{Q}{2} * C_H\right) = \left(\frac{9,600 * 28}{392}\right) + \left(\frac{392}{2} * 3.50\right) = \$1,372 \text{ yearly}$$

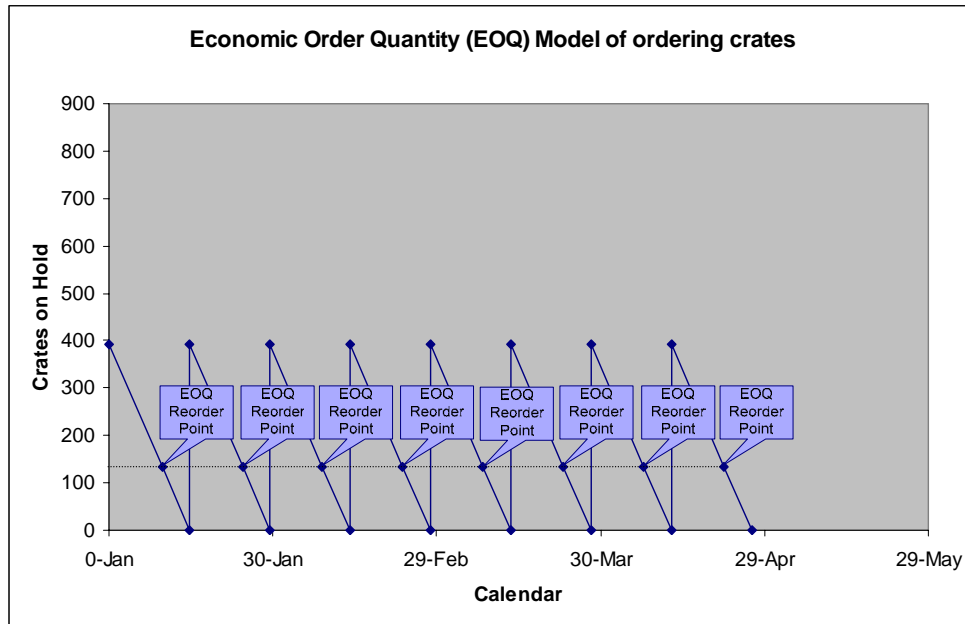
EOQ = Economic Order Quantity                      Q\* = Number of crates per order

D = Yearly demand for the item                      C<sub>o</sub> = Order cost per order

TAC = Total Annual Cost                                      C<sub>H</sub> = Holding cost per unit per year

$$EOQ = Q^* = \sqrt{\frac{2 * D * C_o}{C_H}} = \sqrt{\frac{2 * 9,600 * 28}{3.50}} = 392 \text{ crates per order}$$

Figure 2



**Assumptions/Limitations:**

Under the EOQ model, demand is known, constant, and independent of all other variables. Lead time is also known and is constant at 5 days. Also, the receipt of inventory is instantaneous and complete at the end of each cycle. It doesn't take in account supplier shortages or extenuating circumstances. In addition, quantity discounts are not possible, and the only variable costs are ordering and holding costs. Also, stock-outs are completely avoidable.<sup>5</sup>

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<sup>5</sup> Inventory (ABC & EOQ).  
[http://www.georgiasouthern.edu/~gburke/11%20Inventory%20Management%20\(ABC%20&%20EOQ\).pdf](http://www.georgiasouthern.edu/~gburke/11%20Inventory%20Management%20(ABC%20&%20EOQ).pdf),  
November 5, 2006.