

Engineering Cost Analysis TRG

This report helps to measure the return on investment on the utilization of an updated gasket splicing machine as well as the purchase of a new semi-automated gasket splicing machine.

Situation

TRG has a current production method that involves the operation of a manual gasket splicing machine, the company is interested in the acquisition of a semi-automated gasket splicing machine to optimize the process and facilitate the use of the machine by the operator.

Methodology

A cost analysis using Microsoft excel was used, measurements that were used include:

Sale price per unit: the sale price per unit is the average sale price per gasket, this value was calculated using the formula displayed below, the values of February were used to calculate initial estimates. The sale price per unit is measured in dollars.

$$\text{Gasket Selling Price} = \frac{\text{Total Revenue}}{\text{Gaskets made}}$$

Sales volume per period: number of gaskets sold during a period measured in gasket units.

Total sales: dollar amount equal to do the product of the sales volume by the sale price per unit

Variable cost: the total variable cost is the sum of variable costs, these include the commission per unit, the direct material cost, the shipping cost per unit, the supplies cost per unit and any other variable cost that is not part of the previous ones. the sum of the variable costs is the total variable cost. the material cost was calculated using the formula:

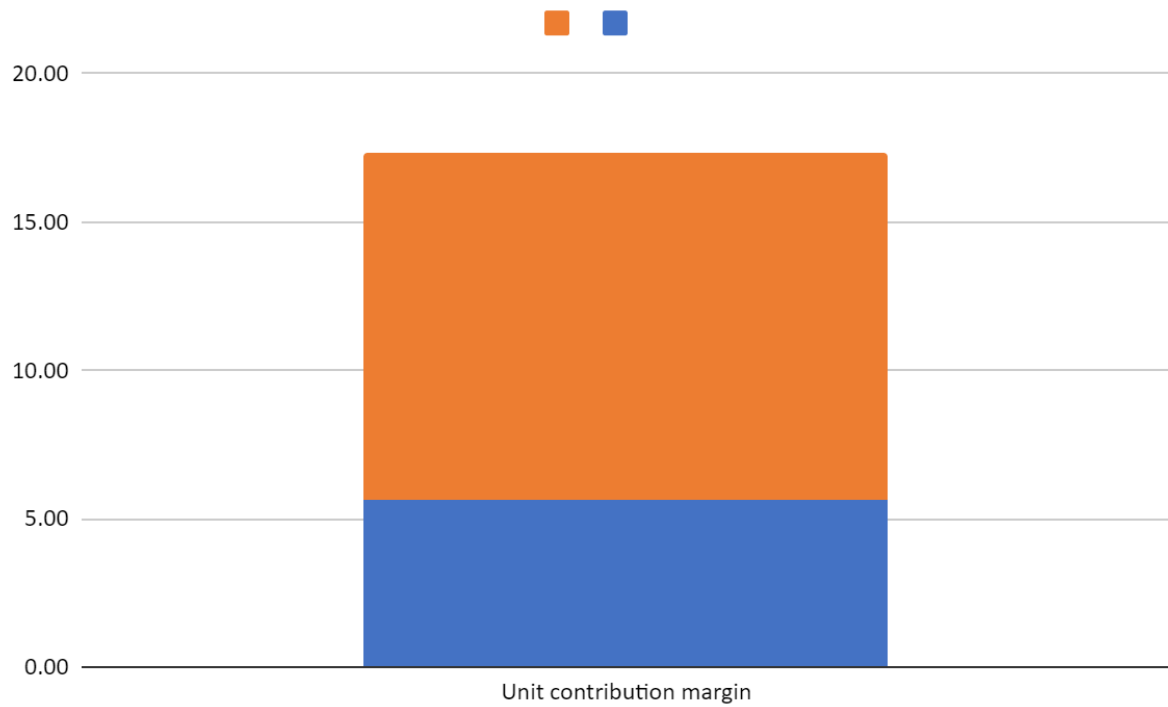
$$\text{Cost per Gasket} = \frac{\text{Total variable cost per period for gasket}}{\text{Gaskets made}}$$

Unit contribution margin: is the difference between the unit sale price and the variable cost.

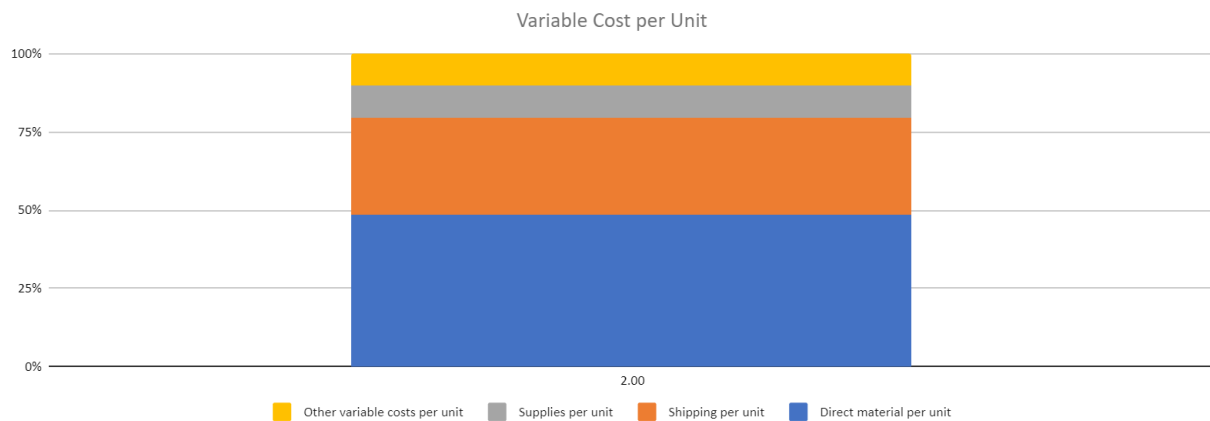
Fixed cost per period: is the sum of the fixed costs per period, these include administrative costs, Insurance, property tax rent, and other fixed cost that are not included in the previous ones.

Cost Estimates of buying the machine from third parties.

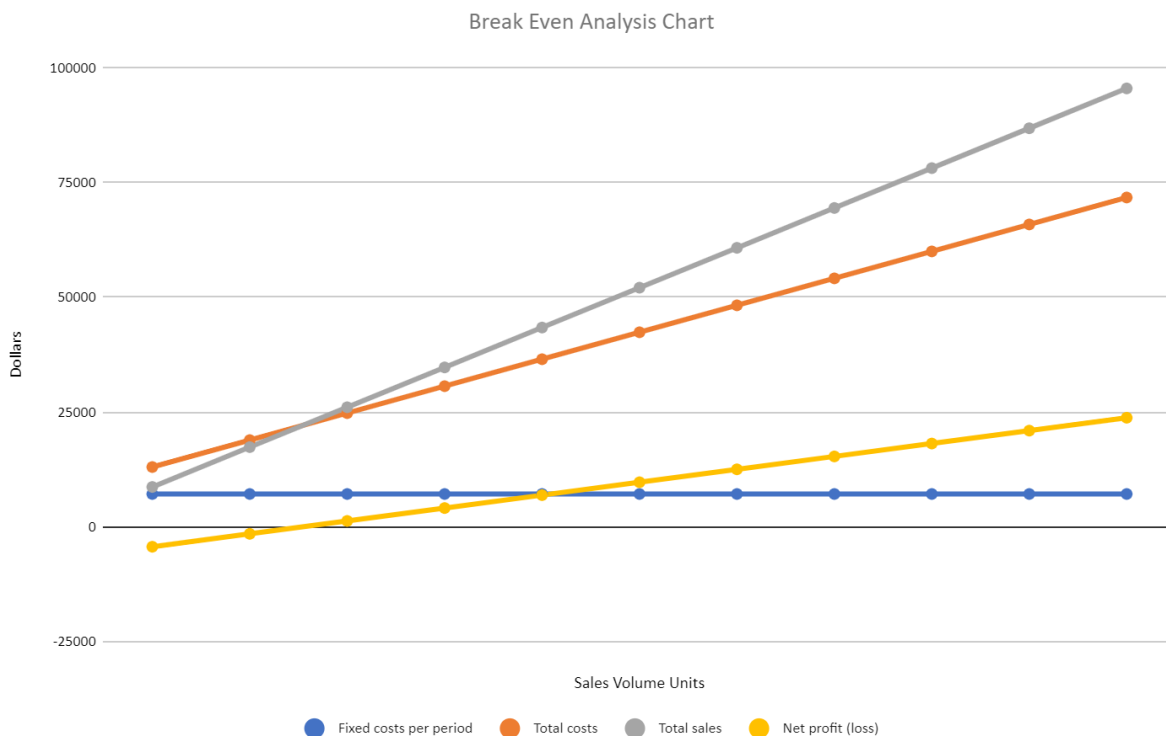
After consulting in online markets for industrial equipment it was found that a semi-automated automated machine cost is around 4,750.00 USD. The amount was plugged in the excel file as a fixed cost and an estimated break-even point was found to be at the 1272nd however this value is based on many arbitrary assumptions about the variable cost per unit and could change when the customer inputs the correct values for this cost.



The unit contribution margin graph displays how much of the total sale price is revenue



The variable cost per unit graph displays how the individual variable cost adds up to the total variable cost.



The Break-even analysis chart displays the point in which profit is generated based on the sales being equal to the sum of the variable and fixed cost added together

Cost Estimates of new design

The new machine design will be designed in the fall semester of 2021 by the UCF mechanical engineering team, the cost of designing these machines is going to be documented and it can be plugged in the excel sheet to find the break-even point gasket number associated with the implementation of the new machine.

Arbitrary values

many of the values in the excel sheet are arbitrary since these values are expected to change through the year, a better approximation of the values can be used by inputting the values in the excel spreadsheet

Future Value

The excel file has the formulas needed to calculate the break-even point in terms of units made and sold, with the implementation of new practices that reduce cost and the effect of economies of scale the value of the variable costs could decrease, and in terms could change the number of gaskets needed to break even. The excel sheet can be used in the future to recalculate the break-even point of gaskets made and sold under new conditions

