Margin Increase as a Function of Quote Precision Optimization for Packaging Automation Projects and Services

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Abstract *— This document describes design and development of quote optimization process using margin increase as a critical process response. It analyzes the aspects of estimating project or service in the packaging machinery industry. The process begins by acquiring specifications; designing or coordinating resources, time and order fulfillment. Resources considered a range of factors from machinery to spare parts, labor to travel expenditures and hardware accessories. A 35% margin was established as acceptable by customer and management. Invoicing and other metrics acknowledged a profit lower than 35% target. This states an opportunity to increase and maintain goal margin. The procedure and resources were studied to assess over-expenditures deficiencies. Current economy scarceness has increased competition to the extent of company earning trade-offs for "survival". Methodology used included a Pareto diagram which was developed to determine which price range or project scale was most impacted to concentrate efforts and assign causes. Six Sigma methodology: Define, Measure, Analyze, Improve and Control was selected for implementation. Supplier Input Process Output Customer diagram which lists manufacturers, resources, operation, services and clients, was used to evaluate all possible factors impacting the response. Value Added Analysis was performed with resource expenditures derived from invoices reconciled over the year 2013. Standardize, Mistake Proofing, Pull System and Work Balance strategies were combined to generate improvement forms that calculate and keep track of progress performance while enabling scope deviation detection.*

Key Terms *— Margin, Packaging, Quote, Specifications.*

INTRODUCTION

A quote is a document that offers a good solicited or presented. It describes the item, indicates availability or lead time and lists the price. To develop a quote the following information must be gathered: company, contact, specifications, resources required to deliver scope, time or transportation arrangements to acquire material, accommodation or traveling arrangements for technicians and due date. It is important to estimate correctly for a customer to give you an order and fulfill both company's sales and margin targets [1]. It is expected to standardize and mistake proof a process to develop quotes in a +/-5%, when updating an estimate to reconcile an invoice.

Now a day's companies are competing for the few profitable opportunities available during the present economic situation. The project understudy will develop an observational, retrospective and longitudinal research on Machinery Packaging Automation Projects' information regarding how to optimize quote intervention. A standardized and mistake proof process will be developed to improve the precision with which a quote will be estimated, executed as a project and reconciled/invoiced.

BACKGROUND INFORMATION AND LITERATURE REVIEW

Machinery Packaging Automation Projects are a combination of machinery, accessories, labor and expenses to install, modify or repair production lines that pack products to be transported and distributed. Packaging ranges from de-palletizing, unscrambling or single filing containers, labeling, filling, capping, sealing, case forming, printing/coding, inspecting, palletizing, wrapping, conveying, and storing a product. Machinery

manufacturing corporations make discount deals with distributors to sell their equipment in a determined region. At the same time cost inflation from supplier is reflected or distributed to end customer if economy decays or distributor quotas are not fulfilled. Accessories are hardware, such as screws, nuts, washers, expansions, metal sheets or tubes/extrusions and specialized/customized tooling or products bought from a retailer with which the company does not hold a distributor relationship. Labor services are the amount of human resources or in this case mechanical/electrical technicians required to develop and complete a determined objective. The end customer's time frame, type of service, the tasks required and the skilled resources available determine the amount of hours to be included on the estimate. The labor expenses or operational costs to be included are travel, vehicle maintenance or mileage, meals, lodging and any other required. The project manager has to keep updated with the latest and most efficient technology trends [2]. It is said that embarking to many business may lead to losing a tight grip on everything held if precautions are not taken.

Figure 1
Unscrambler

Figure 2
Labeler

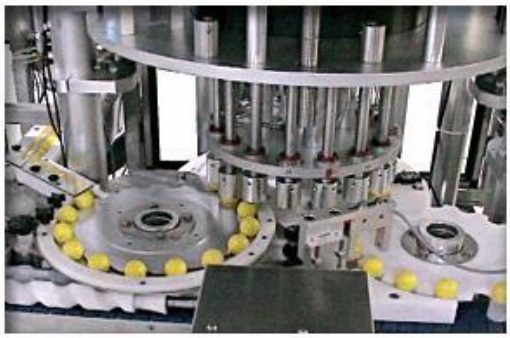

Figure 3
Filler

Figure 4
Case Sealer

Figure 5
Palletizer

Figure 6
Stretch Wrapper

Figure 7
Conveyor

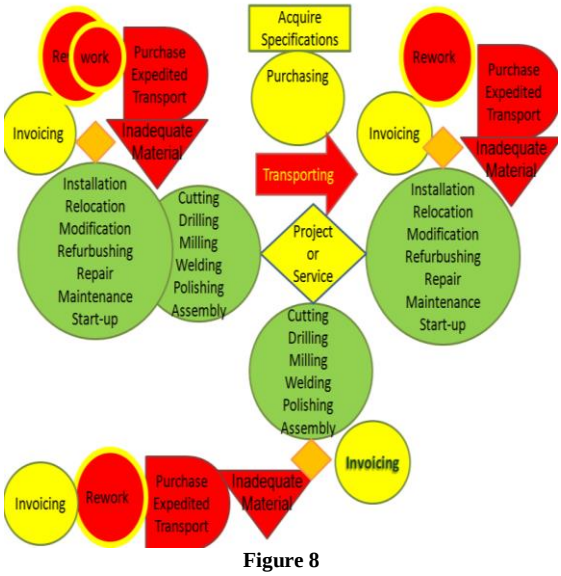

Figure 8
Process Flow Diagram 2013

The chronology of developing a quote or estimate of a project is as follows: sales representative must acquire specifications to be able to quote appropriate machinery (they receive trainings, literature, updates and occasionally get the opportunity to visit clients with the suppliers); machinery packaging automation group determines accessories, labor and expenses necessary to comply with customer requirements; communication is established with suppliers to acquire information such as minimum quantity, cost, availability or lead time and payment terms; the group and sales representative agree on margin and expected profit to win the bid; when order is placed resources are coordinated considering end customers time frame or window, supplier shipping date, carrier delivery date and service to be performed; to complete process the quote is reconciled against actual costs and invoicing.

PROBLEM STATEMENT

Client account customized pricing is based on length of the relationship, order or bundle size, delivery date requirements, discounts/rebates, currency or financial considerations regarding percents and payment deadline [3]. End customer select bids by lower price, requirement compliance, quality, reliability and random selection for competitive future bids. This leads bidders to make unsuccessful trade-offs to win an order during the current economic conditions [4]. Articles read reported that statistic studies confirm prices are better correlated by competitiveness than quality at the present market where globalization has increased accessibility [5]. Uncertainties overlooked during quote to deliver it quickly, or making tradeoffs to decrease price, lower margin and profit, categorizing them as inaccurate or imprecise. When monthly, trimester or annual goals are not reached firms fall under pressure to cut capacity (reduce operational costs or personnel) to justify output during this economic and social climate.

Observations of project reconciliations have reflected on month's targets unreached, which later on developed to the company's restructuration warnings; similar to the process from which a snowflake becomes the avalanche that brought you "death which was not seen coming". Some administrations strangle themselves by resisting to change and innovation while tying themselves to sponsoring and obsessing with the Moby Dicks instead of any other fish or school in the sea.

Improving precision in quote development will increase profit margin and lower costs related to: reprocessing labor for overlooked specifications or

modifications; adjustment to inappropriate machinery to comply with disregarded requirements; express freight charges associated with unaccounted material; inventory costs linked to uncommon merchandise and quantities; absorbing lodging and meal expenses for extended or overtime services underestimated; and motion/travel/delivery expenses such as recurrent visits that increase vehicle maintenance.

METHODOLOGY

Projects' process information was gathered from procedure training by predecessor, line cards, sales training manual and experience as an end customer as much as project management/coordination. The articles read to research similar situations, corresponded to competitive pricing or biding and business to business customized pricing based on market and relationship. DMAIC or define, measure, analyze, improve and control is a methodology structured from previously developed strategies to identify, asses and solve waste and quality opportunities. It will be used to investigate, develop and describe the project problem statement.

A Pareto was performed on invoiced projects with the following ranges: $0.00-4,999.99; $5,000.00-14,999.99; $15,000.00-29,999.99; $30,000.00-49,999.99; $50,000-75,999.99 and $75,000-104,999.99.

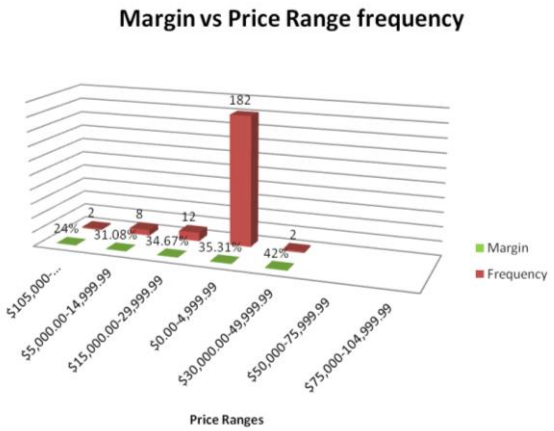

Figure 9
Pareto 2013

The range with the lowest profit margin was targeted for improvement. Improve precision on quote margin +/-5% invoiced project.

Step by step procedures for DMAIC will be detailed and scheduled in this section: Define: SIPOC or Supplier, Input, Process, Output and Customer diagram lists sources, material, procedure, goods and clients from a targeted operation; CTQ or Critical To Quality based on VOC or Voice of Customer are requirements demanded by client which need to be transformed to manufacturing or services specifications and a Pareto graph will be constructed to find which project price range or bar (20%) is mostly related or responsible for 80% of minimum unacceptable margins.

Measure: Waste ID or identification of inefficient procedures (Overproduction=change orders or modifications; Waiting=task delay for specifications, drawings or material; Transport=Material back and forth for lack of specifications and dispatch inspection; Over processing=rework for lack of specifications and standardization; Inventory=accumulation of ordered but unnecessary material; Defects=mistakes on quotes and services; Human=lack of training); Value Added Non Value Added Analysis pie chart breaks down an operation and determines the amount of resources dedicated to each step and categorize if it contributes to the offered good or to administrative politics; Cause and Effect depicts relationships visually through lines that link faults in Measures, Man, Machine, Method, Material, Environment and Management to the effect or scope.

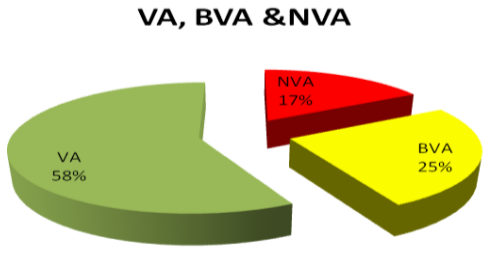

Figure 10
Value Added Analysis 2013

Analyze: Tool ID or identification will determine the strategies or solutions selected and customized toward established goals (Standardize, Mistake Proofing, Pull System and Work Balance).

Improve: Before and after analysis will confirm if tool implementation was assertive according to measurements and analysis methodology deployed (increase responsiveness, improve productivity and minimize variability).

Control: Plan Do Check Act will establish or regulate the proposed and approved improvement officially.

RESULTS AND DISCUSSIONS

The pilot program or implementation period was tested January 2014. During this period customer companies plan and submit capital budget. Only 3% of year demand was fulfilled and reconciled. This seasonal trend is due to how our customers handle project expenditure finances during a fiscal year. Regarding the amount of data compiled Before and After Analysis asses improvement tool impact on process flow procedure; margin average 37% (greater than 35%); and value added analysis increasing 2% business value added activities decreasing 1% and non value added activities decreasing 2%.

Figure 11
Process Flow Diagram 2014

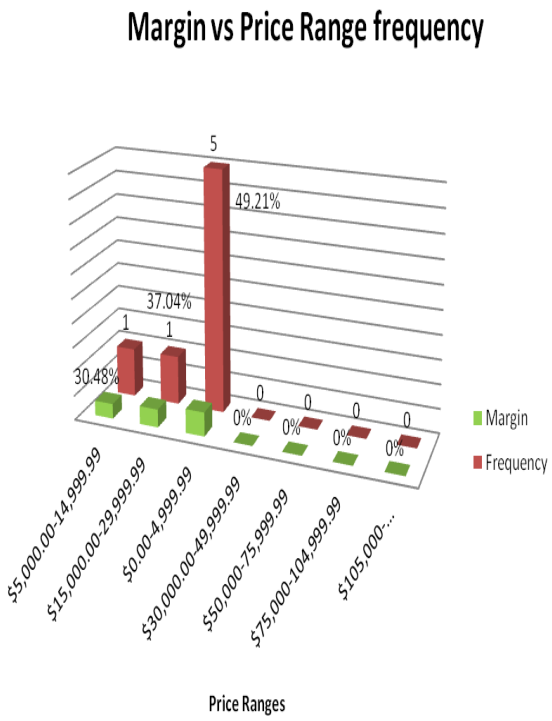

Figure 12
Pareto January 2014

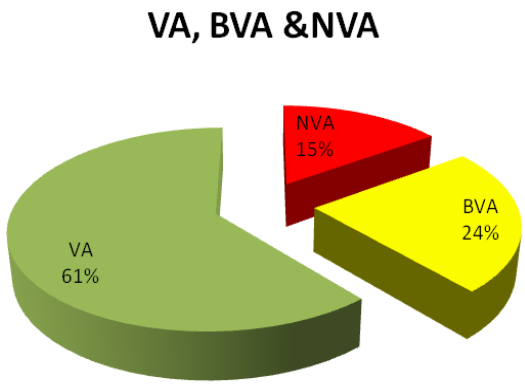

Figure 13
Value Added Analysis January 2014

CONCLUSIONS

Guidance during quote development (Ruiz and Rosario), information research (Nieves) and DMAIC methodology implementation (Torres) helped to focus and concentrate efforts on allocating the root cause of margin optimization and precision. Literature of similar situations

helped assess the situation's impact on the industry and diversity of customized solutions. Improvement documentation procedure: Pull Specifications mistake proofing standardization and Technical Services Work Balance Monitoring will be fully incorporated and scrutinized during 2014. Modifications will be made to documents as sales representatives and technician's feedback per experience is submitted to the technicians' supervisor and team management. The financial metrics of Margin vs Price Range frequency and Value Added Analysis for 2014, accompanied by a Payback period justification of providing software documentation and internet accessibility to our technicians company cell phones will be presented as a proposal to implement the next level of improvements such as in 2 of the articles read [Designing a Predictive Performance Measurement and Control System to Maximize Customer Relationship Management Success & Searching for e-Business Performance Measurement Systems].

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