Setup Time Reduction

How to determine the cost and benefit of reducing setup time

Part IX

By Jerry W. Claunch

Last month's article examined the Sixteenth and seventeenth steps in setup time reduction (16) Auditing the Start Up After Changeover and (17) Overcoming the Resistance. This month's article the last in the series continues this important subject with How to determine the cost and benefit of reducing setup time. (Justification of expenditures, return on investment)

Determining low cost

It is recommended that the initial improvements to your setup time should target those that are low in cost. This will allow you to reduce setup time, get an early payback and later on, use the additional income to fund improvements that are more costly. A good definition of low cost is that it pays back in less than 4 months. It is important to the success of your setup time reduction program that you seek low cost improvements first.

Calculating Return On Investment (ROI)

By providing an easy method to identify the return on investment, you will ensure that every recommendation for expenditure to reduce setup time provides a ROI calculation. If you have a formula in your organization to determine return on investment, that calculation should be provided and used by the improvement team. If one is not available in your organization, Figure 9-1 provides the formula to calculate Return On Investment (ROI). By filling in each blank, and doing the associated mathematical calculation, Once this is calculated, the items that return 30% or less are low cost, which means that they will payback in less than 4 months (30% of a year). It is recommended that every purchase request be accompanied by this return on investment calculation. Doing so, will instill in your employees the need to find improvements that meet your payback requirements. This will keep you from having the automation first mistake. In most cases, low cost improvements will result in as much as 60% reduction in setup time and are easy to implement.

Key drivers to successful setup time reduction

Time and money are key drivers in continued improvement effort. If you begin working on setup time reduction and see very little improvement, effort will drop off. If you approach this initiative properly, you should expect to have 30 to 60% reductions in setup time implemented in 2 months or less. Doing so will demonstrate the importance to the organization. If you focused on low cost improvements first, you will realize the financial return quickly and avoid the automation first mistake.

Automation first is a common mistake

Many times, when employees understand that you need to reduce setup time, their first inclination is to develop and recommend automation solutions. Typically automation will provide a 15% payback. If you rely on automation improvements, they are costly and when compared to the ROI calculation, may take years to pay back. Usually in this environment, your setup time improvement fades away due to the cost. Many companies spend large sums of money to automate and still have the same inefficiencies of travel, transporting, tweaking and so on during setup.

Getting the return on investment

It is especially important that management ensure that the payback is realized, because without it, this effort will die out. Payback is when you actually get the return on investment you predicted in the ROI calculation. I recommend that you determining what would increase productivity for your shop and make sure those are achieved as you reduce setup time. You can use the formula for productivity in determining if the efforts actually providing the payback. In most shops, the return on investment for setup time reduction is generated from increasing production time. By doing this, your will receive faster invoice payment as a result of shorter lead-time. Increased sales should be generated due to less time spent setting up and more time producing salable product. This al results in higher income. Figure 9-2 provides the formula for determining the productivity measurement. This calculation should be done monthly and reported as shown in the graph in figure 9-3 Productivity Measurement Graph.

HOW TO DETERMINE IF YOU ARE SUCCESSFUL: If productivity is not improved, the effort has failed. I have seen cases where setup time is reduced but productivity (output divided by input) remains the same. This can not be accepted. Reduced setup time must be replaced with more output. Management must put special emphasis on the need to achieve the return on investment as a result of setup time reduction, and that return must be in the form of real income. This actual return on investment is the real measure of your efforts in reducing setup time.

Conclusion

Setup time reduction is an important improvement in our very competitive environment. I hope that through this series of articles, I have provided not only its importance but enough information that you can implement setup time reduction in your company. Getting focused, achieving results quickly and continuous improvement are keys to success. No longer do you have to accept setup time in your shop.

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Determining ROI of expenditures for **Machine Setup**

A. Identify the Overall Value of Machine Setup Time

1. Value of one fully burdened hour of machine time = $ ______________________________ .
2. Divided by 60 (minutes per hour) = _____________ .
3. Times the average % of downtime for change over __.________ (%) = $ ________________ .

(One minute setup value)

B. Identifying the Total Purchase Cost

4. Identify each item to be purchased (material and equipment)

Item	Delivered price
____	$ __________________
____	$ __________________
____	$ __________________ etc.

(use additional pages if necessary)

Total purchase price $ ________________

5. Add design costs

Internal $ ___________ + External $ ___________ = Total design cost $ ____________

6. Identify labor costs to install

Internal $ ___________ + External $ ___________ = Total labor costs $ _____________

7. Identify training costs to implement

Development $ _________ + Conducting $ _________ = Total training costs $ ___________

8. Add all purchase costs Total purchase cost: $ ___________________

C. Identify the Value of the Purchase

9. Identify number of minutes reduced on each setup = _____________ .

10. Times the number of setups per year ___________ = _____________.

11. Times the one minute setup value $ _______________ = $ _______________

(Line 3) (Annual benefit)

D. Identifying the Payback

12. Total purchase cost = $ ______________ .

(Line 8)

13. Divided by annual benefit $ __________________ =___________________ % ROI.

(Line 11)

% ROI Rules of thumb:

20% or less should be immediate purchase. (2.5 month or less payback)

20% to 100% should be available from budget. (1 year payback maximum)

Over 100% needs capital justification. (greater than 1 year payback)

Figure 9 - 1: Determining return on investment.

Productivity Measurement

Monthly costs $ ______________________

Monthly Income $

= ____________ %

Figure 9 - 2 Productivity Measurement

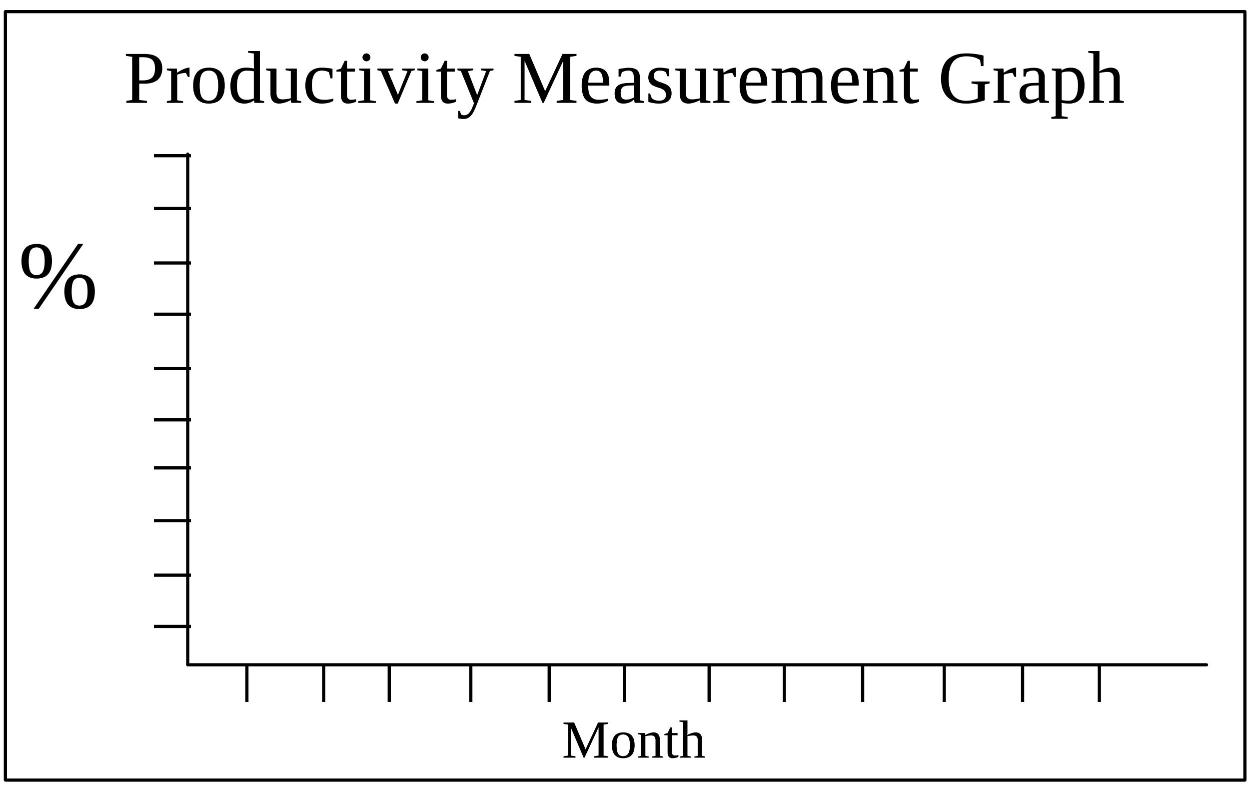

Figure 9 - 3 Productivity Measurement Graph