

Measuring Productivity

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Productivity

Broadly, a measure of the output vs.
the cost

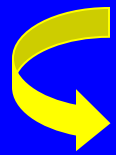
Economists have always defined it
as

$$\frac{\text{OUTPUT}}{\text{INPUT}}$$

Or in non-economic terms

What the worker/employee gives you
What you gave the worker/employee

This can also be applied to



a work team, a department,
a production line, a factory,
an office, and so forth

Now to calculate productivity, you normally would use something like

$$\frac{\text{Earned Hours}}{\text{Total Hours Present and Paid}}$$

For our output, you can also use

ॐ Standard Hours

ॐ Rated Capacity Hours

ॐ Pieces / Volume

What is an earned hour?

It is normally defined as the value of work completed by an employee, team, department, etc. based upon a “norm” and then converted into hours.

ॐ Norms are generally expressed as UPH (Units Per Hour) or HPU (Hours per unit)

ॐ Fundamentally, a norm is usually expressed in pure time, with no downtime, work factors, etc added to it.

Norms can be converted into earned hours in one of the following methods:

$$\frac{\text{Volume Produced}}{\text{UPH}} = \text{Earned Hours}$$

OR

$$\text{Volume Produced (x) HPU} = \text{Earned Hours}$$

What is the difference between
standard hours and earned
hours?

Standard Hours:

- ॐ Traditionally created by industrial engineers
- ॐ Initially developed for the purpose of cost accounting - profit planning
- ॐ Includes work factors, downtime, scrap, waste, etc.
 - to insure that ALL COSTS are considered when looking at the “Per Unit” price with the attempt to maximize profitability

Standard Hours:

- ॐ are conceptually a fine tool to use for cost accounting
- ॐ are NOT a good tool to use when calculating productivity
- ॐ when used, productivity typically could be from 90 - 120%

WHY?

Earned Hours:

ॐ are pure with no downtime, no factors, no waste or scrap included

ॐ when used, productivity could be from 50 - 90%

WHY?

So productivity is typically:

Earned Hours

Total Hours Worked, Present, and Paid For

The denominator should include

ॐ scheduled coffee/tea breaks

ॐ prayer breaks

ॐ wash-up time

The denominator should NOT include

ॐ absenteeism

ॐ vacation time

ॐ supervisory time

Some other similar but different calculations are:

ॐ Utilization

ॐ Efficiency

ॐ Attainment

Utilization:

A measure of an employee's or a group's effectiveness. It is usually shown as a percentage. In this case, downtime is considered.

One version of utilization is:

Earned Hours + (Reported Variances)

Total Hours Worked, Present and Paid For

Or, a second version of utilization is:

Earned Hours

Total Hours Worked, present and
Paid for (- Reported Variances)

Normally, if all variances on downtime are reported then utilization will be/should be close to 100%

Productivity, particularly when reported in the lower figures, while honest, can be demoralizing to workers.

Remember, the average worker comes to work to do his or her job as fully as they are capable of doing.

So, while productivity may be low, utilization can be much higher, helping to deal with worker motivation and insure that ALL variances/causes for downtime are being reported.

Efficiency

is a measure of the allocation of resources. It is the relationship between the planned resource requirements (labor or machine hours required) compared to the actual resource time charged to the task(s). (The worker at standard hours.)

One example of efficiency
could be

$$\frac{\text{Hours Worked (charged) @ Std.}}{\text{Total Hours Worked and Paid}}$$

Performance

is normally a ratio, usually expressed as a percentage, of actual output (in earned or standard hours) compared to actual hours EXPENDED while producing these same earned or standard hours.

The performance ratio would look like:

$$\frac{\text{Output (Earned Hours or Standard Hours)}}{\text{Hours Worked (ONLY while producing the same earned or standard hours)}}$$

What are the major differences between

ॐ Productivity?

ॐ Utilization?

ॐ Efficiency?

ॐ Performance?

Schedule attainment

is a measure of how much work was accomplished versus how much work was scheduled.

Attainment

can be a measure of:

ॐ customer service

ॐ our production planning functions

Attainment

$$\frac{\text{Actual Production}}{\text{Planned Production}}$$

Are there any others?

What techniques do you and your company currently use?

Are they calculated as we
have discussed?

Based on this training

what changes, if any,
would you make or
recommend at your
company?