

# Three Ways to Calculate Return-On-Investment (ROI) For A High-Speed Digital Camera

John J. Foley  
Executive Vice President  
Fastec Imaging Corporation  
858-592-2342  
[www.fastecimaging.com](http://www.fastecimaging.com)

There are three major areas where the potential savings from efficient high-speed video analysis can be readily quantified: reducing waste, increasing production capacity and reducing downtime. This paper will examine each of these areas and show you how to calculate the potential savings in your own plant.

## Reduced Waste

A high-speed digital video camera can have a major impact in high-volume production environments where direct materials are a major variable cost. When manufacturing processes get out of control, common trial and error solutions typically prolong the time needed to correct the process. The result is that material wastage can often run extremely high.

The following graph depicts the potential savings connected with reducing material waste in a high-speed production environment. Specifically, the graph shows the annual savings resulting from reductions of 1%, 2%, 3%, 4% and 5% in direct material waste. For this example, we have assumed annual direct material costs of from \$1,000,000 to \$5,000,000, but it's a simple matter to plug your own plant's actual figures into this equation.

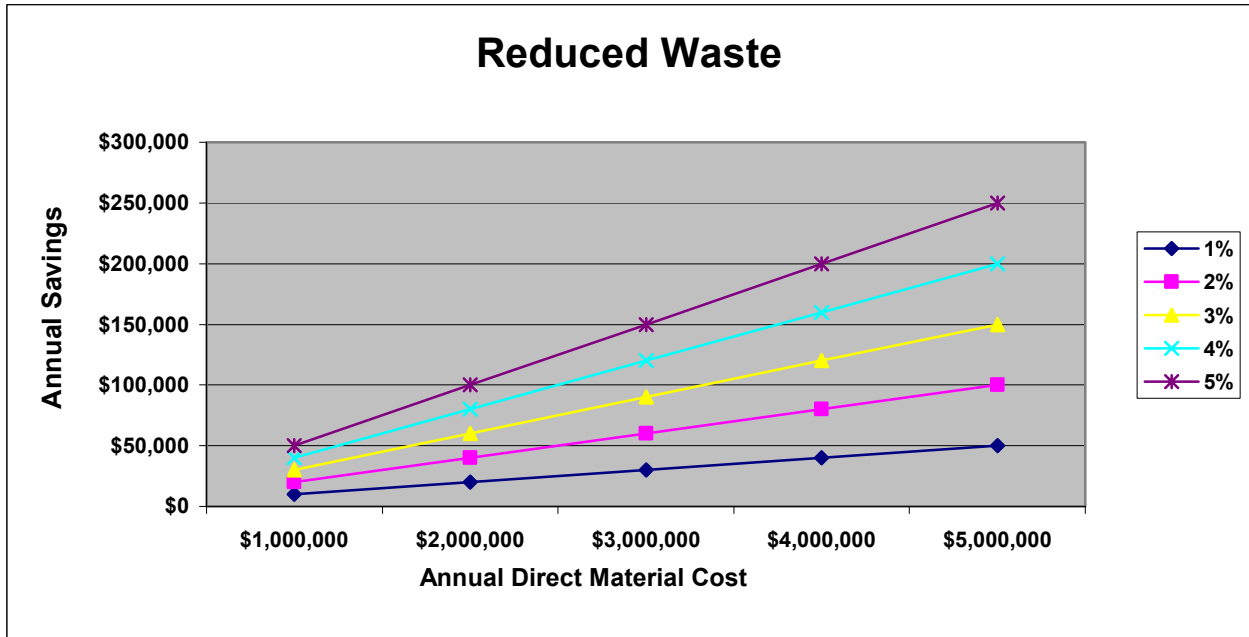
To use the graph, two things must first be determined:

1. The annual direct material cost
2. The estimated percentage reduction in wastage

From these two coordinates, the savings can be found on the Y-axis of the graph. There are, however, some important points to keep in mind.

1. This graph shows *annual* direct material costs and *annual* savings. This information is important in the return on investment calculations but don't forget to extrapolate these savings into future years.
2. These savings are *incremental* savings. The graph doesn't address the potential savings in labor and overhead, only the savings in direct materials. While there will almost certainly be reductions in labor and variable overhead costs, this graph gives a conservative estimate of savings because it focuses solely on direct materials.

- The graph is intended to quantify savings on *one* production line. Remember that a high-speed digital video camera can produce similar savings on multiple lines. A thorough financial evaluation should quantify the savings on *each* production line.



### Increased Production

High-speed video analysis can help increase production by fine-tuning the production equipment to operate more smoothly. By reducing the amount of dwell time between operations and by reducing jams and other work stoppages, line speeds can often be increased. Increased line speed translates to higher output during a given shift. As an ancillary benefit, higher output from existing equipment can help delay or even eliminate the need for purchasing additional production equipment.

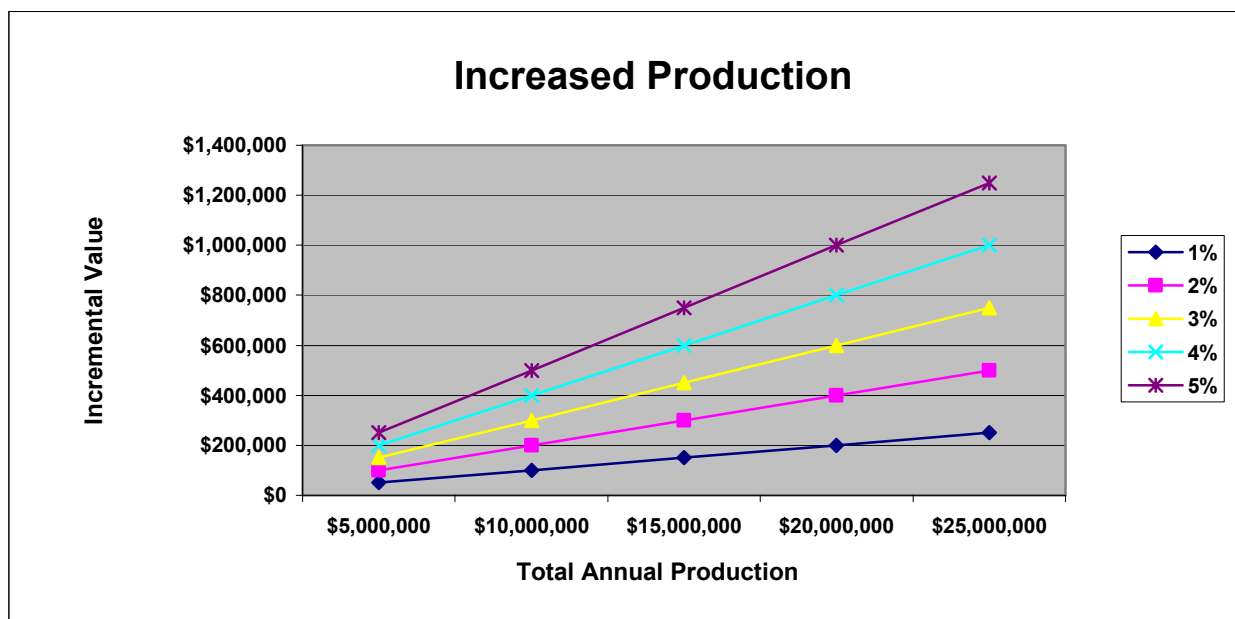
The following graph depicts the potential annual increase in production gained by increasing the output of a given piece of manufacturing equipment. Specifically, the graph shows the increase in revenue resulting from increases in production output of 1%, 2%, 3%, 4% and 5%. For this example, we have assumed total annual production values from \$5,000,000 to \$25,000,000, but it's a simple matter to plug your own plant's actual figures into this equation.

To use the graph, two things must first be determined:

- The annual level of production
- The expected percentage increase in output

From these two coordinates, the incremental annual revenue can be found on the Y-axis of the graph. There are, however, some important points to keep in mind.

1. This graph shows *annual* production and *annual* increase in production revenue. This information is important in the return on investment calculations but don't forget to include the impact of increased output in future years.
2. The graph shows a benefit that is difficult to quantify without knowing the specific situation of a particular company. It is clear, however, that increasing output from existing equipment can lead to very real savings if it delays or eliminates the need for additional equipment when production capacity is strained.
3. The graph is intended to quantify the effect of increased output on *one* production line. Remember that a high-speed digital video camera can produce similar savings on multiple lines. A thorough financial evaluation should quantify the impact on *each* production line.



### Reduced Downtime

Another way that high-speed video analysis can help improve a high-speed manufacturing operation is by reducing machine downtime. If the manufacturing lines are running more smoothly, jams and other work stoppages are generally reduced. This directly increases line yield. When jams do occur, the error detection and correction process is faster and production is resumed much more quickly.

Based on a one-shift, 5-day per week manufacturing operation, if you can eliminate a single recurring problem that only happens once per hour and takes 2 minutes to clear, you can increase your available production time by roughly 70 hours per year. That's almost nine full shifts!

The following graph depicts the potential annual production hours gained by a decrease in machine downtime. Specifically, the graph shows the increase in production time available by reducing downtime by 5%, 10%, 15%, 20% and 25%.

To use the graph, two things must first be determined:

1. The current annual downtime hours
2. The expected percentage reduction in downtime

From these two coordinates, the incremental annual production time available can be found on the Y-axis of the graph. There are, however, some important points to keep in mind.

1. This graph shows *annual* downtime and *annual* increase in available production time. This information is important in the return on investment calculations but don't forget to include the impact of increased output in future years.
2. The graph shows a benefit that is difficult to quantify without knowing the specific situation of a particular company. It is clear, however, that increasing output from existing equipment can lead to very real savings if it delays or eliminates the need for additional equipment when production capacity is strained.
3. The graph is intended to quantify the effect of increased production time available on *one* production line. Remember that a high-speed digital video camera can produce similar savings on multiple lines. A thorough financial evaluation should quantify the impact on *each* production line.

