

# Automation Tips and Techniques for Growing Your Infrared Program

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## Abstract

The infrared market continues to grow and expand as thousands of new infrared cameras are being sold every year. New ways to use infrared are being discovered and implemented every year. As the infrared camera market continues to grow, so do the opportunities for thermographers to grow their business.

For this paper, I will classify thermographers into two categories. The first category is thermographers who work for infrared inspection companies. These thermographers do inspections for other companies. The second category is a “plant thermographer” who does inspections for his own company. These thermographers are responsible for inspecting their own plants and facilities. Some of the techniques described in this paper will work for both categories and others will only be relevant to one category.

## Inspection Management and Data Storage

Inspection Data and Paperwork – it is the life blood of the infrared inspection business and it is the least liked part of the thermographer’s job. Documenting what you have tested and what you have found is a never-ending task. It costs time and energy to make a professional report and consistently do it day in and day out. Every time a thermographer steps on the job, he creates paperwork. Even if he does not find any problems, he still needs to record what equipment he tested and what he did not test.

As an inspection company, you are the keeper of information for your clients. Whether on paper or electronically, you are responsible to tell your customer what you tested, what you did not test, and the problems that you found. This accountability is as much for your protection as it is for your clients. This is an example that you don’t want to

experience, but given enough time in the infrared industry, you probably will. You read the headlines in the local paper “**ABC Chemical plant burns to the ground**”. ABC is your customer and suddenly your phone rings. It is the insurance company for ABC Chemical and they want to know “during the last infrared inspection you did 3 weeks ago, did you check the main electrical panel and what were the results?”



Records, records where did I keep those records? Your answer to ABC’s insurance company’s question could mean the difference between growing your infrared company or closing it down.

Knowing that you need to keep your customer records for your defense as well as repeat visits, is the first step in designing an inspection management system to take care of this need. A common mistake new inspection companies make when starting their business is to use the common tools at hand, such as Microsoft Excel or Microsoft Access without looking farther into the future. By setting up one Excel spreadsheet or one Access database per site, you are creating a ticking time bomb and an organizational nightmare for your business later on. This system starts out fine, but as you grow, you will need to deal with hundred and sometimes thousands of Excel spreadsheets or Access databases. You will need to create an organizational system just to organize these files to be able to use them or find them. Not to mention the headache of version control or if your database gets corrupted, which Microsoft Access is well known for.

There are many ways to estimate your data storage needs, so whichever way you use, try to overestimate your need instead of underestimate so you won’t be surprised later. One estimation method is if the average number of days a full time thermographer does inspections is 120 days and the average number of days per annual inspection is 1 day with no repeat visits during the year, then he visits 120 sites per year. If the average number of days per annual inspection is 1.5 days, then he visits 80 sites per year. Say an infrared company averages 1 day per annual inspection, starts with 1 thermographer

and adds an additional thermographer each year. By the year 5, there are 5 full time thermographers working with 600 Excel Spreadsheets or Access databases. If the company specializes in 2 day inspections, you are looking at 1200 Excel spreadsheets or Access databases.

So, the well known tools are not always the best solution for your needs. Here are 3 points to consider for inspection management and data storage.

1. When deciding on a business process of collecting and storing data, consider 2 to 5 years of data storage and factor in optimistic growth in clients, sites and number of inspections. This will give you a good estimate ballpark for your storage needs.
2. Store your data for all your clients and sites in one database. This means you have one place to go to store, review, analyze and backup the data. Since this means your database might grow large, you should choose an enterprise database designed to handle the data load such as Microsoft SQL, Oracle, or Sybase SQL. There are many varieties of SQL that are inexpensive or free, such as MySQL.
3. You should store your client's data for as long as they are your client, so consider backup and archive processes. Even though hard drives are large and inexpensive, they are prone to failure, so consider saving past history onto CD's as a good, inexpensive and somewhat permanent way to store your records. Make 2 copies and store them in 2 different places, just in case a fire destroys one copy. Just like a doctor's office will keep your health records and findings for every visit to the doctor, you should keep your clients infrared inspection health records.

Data storage and accountability is becoming more and more important as the number of hungry lawyers grows and insurance companies continue to look for scapegoats. Also, it is wise to have a well-written disclaimer that defines what you are and are not responsible for and have it printed in your contract and also a version of it on the cover sheet of your inspection report. This does not guarantee protection, but it does help in the event you get taken to court.

## **Inspection Scheduling**

For the inspection company, inspection scheduling can be a nightmare if not set up properly or not utilized effectively. Between the limited resources of thermographers and cameras, throw in customer cancellations, vehicle breakdowns, camera breakdowns, and emergency customer calls, scheduling can literally be a royal headache. By learning from the previous years' inspections, scheduling headaches can

be reduced somewhat. Customers can request inspections because of weather, time of year, or in response to plant shutdowns. Whatever the reason for the timing of the inspection, there is usually a pattern you will see from past years and you should be able to use this information to better plan and schedule your resources more effectively in the coming year. By calling your clients several months in advance before their next annual inspection gives you and your customer time to arrange a mutually agreeable time for the inspection. This also gives you time to arrange flight plans, if needed, ahead of time while the rates are better.

## **Follow-Up Inspections**

Once you have inspected a client every year, you might suggest coming back for a short follow-up visit to close the open problems you found in the last inspection. The thermographer should be the one to verify that the problem is fixed, not the electrician who repaired the problem, since the thermographer is the one with the infrared camera. While you are there, you can also suggest inspecting the equipment that was not tested since it was not running or not loaded. This is the beauty of having an inventory list so this 5 day inspection once a year can grow into 6 or 7 days with follow-up inspections. This also helps build better customer relationships with repeat visits.

## **Inspection Reports**

Inspection reports are the key deliverable for all thermographers. For a thermography company, a professional looking report could mean the difference between keeping a customer or losing it to a competing company with a better looking report or less expensive price. For the plant thermographer, it is important to be able to customize the report to their company's standard or create a standard report and then reproduce it over and over again. Reports should be easy to generate and professional looking. Ideally, a standard format should be set up so even between different inspections and different thermographers the reports will look the same. Ultimately, it is the customer that is looking at the final results of multiple inspections and they usually don't want to look at different reports every time. Setting up a procedure to generate reports quickly and accurately is crucial to optimizing the use of the thermographer's time. Less time spent doing paperwork means more time to do other things.

Also, some infrared companies, when competing for your client, will review your past reports and try to criticize the quality of the report or the findings. The more professional and consistent your reports are, the harder it is to steal your client.

## Sharing the Inspection Results

Printed reports are the standard medium for inspection results and good color laser printers are expensive but necessary to print these reports. Since the inspection reports are the lasting impression you leave with a customer you might see once a year, you want to give them the best looking report you can. Color laser printers that use wax or toner are more expensive up front but are more cost effective than inkjet printers over the long run. It is a common mistake to buy an inexpensive inkjet printer to start out with since the laser printers are so expensive, but the hidden cost is in replacing the ink cartridges that these inkjet printers seem to devour. This is why you see so many spam email ads wanting to sell you inkjet cartridges for 85% off retail price.

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These refills are a cash cow for the inkjet distributors. Unless you are printing a very low volume, the total cost of ownership (TCO) is less over the long run to buy a good color laser printer and a service warranty for it than an inkjet printer and ink refills.

Another method to give your customers their reports is electronically printed to Adobe Acrobat format (.pdf) and burned onto a CD. Burning inspection reports to CD and giving the customer the CD before you leave the plant is very effective in showing your customer instant results with the latest computers and technology. Some customers will be impressed and some will even say they don't need a printed copy since they have the electronic version and are trying to reduce their paperwork. This saves you time and money for this client. Not all clients will be like this and some clients will always want printed reports no matter what the other options are, so keep this in mind before going out and buying a CD burner.

Another cutting edge technology is using the "web" to give your customers access to their inspection data over the internet. By offering access to your reports and results through a web page, large corporations can effectively review and manage many sites over the internet quickly and efficiently. This is very effective when selling your services to corporations with multiple sites across the US. A national manager can instantly

review standardized reports on all their plants without having to search for a stack of paper reports. Summary data over many plants can be reviewed instantly while individual plant detail can also be seen. Current repair status and overall health of all the plants a national manager is responsible for is at his fingertips.

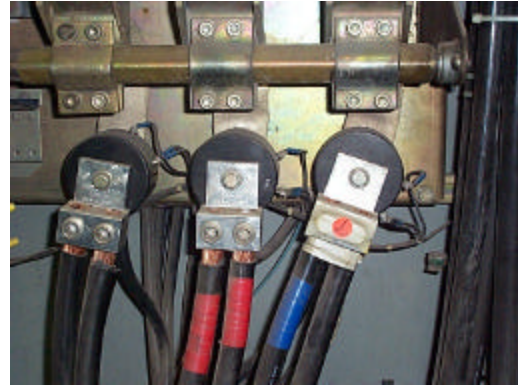
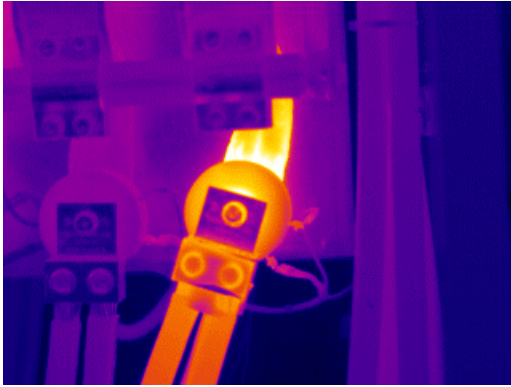
## **Other Uses for Infrared**

For the plant thermographer, once all your electrical components are being inspected on a regular basis, if you have time, look into trying to expand the use of your infrared camera by inspecting the roof, boilers, furnaces, building heat loss, or baseline trend your motors over time. There are plenty of good ideas at infrared conferences on different uses for infrared. As for baseline trending a motor, once you find a problem or an increasing temperature in the motor bearings, you can share your data with other predictive maintenance (PdM) technologies such as oil, vibration, ultrasound or motor circuit testing to better identify and isolate the problem. By combining inspection results from different PdM technologies, your end results are generally much more accurate and comprehensive.

## **Tracking Cost Benefit Analysis**

For the plant thermographer that has been doing their job for years, keeping track of cost savings for each problem found can possibly save your job and the infrared program. Without monthly, quarterly, or annual reports on what the infrared program is saving the company on a regular basis, upper management probably will not know the true value of their infrared program. Cost benefit analysis is more important to established infrared programs than to new infrared programs. Since new IR programs will usually find quite a few problems and some of them will be major finds, this can bring positive attention to the IR program. Once the newness has worn off, the value of the thermography program is in question if there is no feedback to management on how much the program is saving the company. This is extremely important when there is a management change or an outside consultant is brought in to “streamline” or cut costs for the company. When there is no feedback on cost savings from the infrared department, the people who did not see the initial major finds and don’t know how much is being saved on a day-to-day basis, will frequently see the predictive maintenance department as a prime target for cost saving and reduction. Many people saw this personally in the last few years when they lost their jobs.

By using “Before failure” versus “After failure” costs on parts and labor alone, you will get a very conservative cost savings that will add up quickly. Below is an example:



Before Failure	After Failure	Cost Savings for this Problem
Parts = \$50 approximately	Parts = \$1000 approximately	Parts = \$ <b>950</b>
Labor = 1 hr @ \$35/hr = \$35	Labor = 2 hrs @ 35/hr = \$70	Labor = \$ <b>35</b>
Total = \$85	Total = \$ 1070	Total = \$ <b>985</b>

By using this system of simply comparing parts and labor "before" versus "after" failure, we can see the real hard dollar savings of implementing and justifying an infrared PdM inspection program. This 1:4 cost savings ratio was calculated from data gathered using InspecTrend, an infrared PdM inspection management database. Later, this ratio was independently verified by Hartford Steam Boiler (HSB) with their own data and calculations. HSB also verified that if you take into consideration loss to production, spoilage, extra expenses, etc. that this cost savings ratio on average can be closer to 1:20, depending on the industry. <sup>(1)</sup>

## Conclusion

The infrared industry is growing and I wish you the best in capitalizing on that growth. Hopefully, some of the ideas presented in this paper will be useful for you or will give you a springboard for your own creative thoughts.

## References

- (1) "Cost Benefit Analysis of Infrared Programs" by Sandy Sanor - Hartford Steam Boiler Thermography Services and Scott Cawfield - Logos Computer Solutions, published in Maintenance Technology, June 2001, p. 14.

**Key Words:** Infrared, inventory, accountability, repair costs, data storage, business interruption, manufacturing, cost benefit analysis.