



## Productivity and Return on Investment (ROI)

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### Introduction

Software, like any other tool, has a **value**. And oftentimes, that value may be determined in several different ways. Some tools, a satellite GPS system, for example, simply gives you the ability to accomplish a task that could not otherwise be accomplished - or could not be accomplished with the same degree of accuracy or skill that is possible by using the tool. AutoMATE includes a long list of capabilities that satisfy that definition of value - the Global Edit Environment, Intelligent Utility Rough-ins and Schedules, Automatic Elevations, etc.

A second method of determining the value of Software, or any other product or service, is through a quantifiable, reliable, and compelling **Return on Investment (ROI) Analysis** - in essence, determining "What's the bottom line? What benefits can I expect for my investment in time and money, and what is the payback?" The key to providing a credible ROI to answer those questions lies in ascertaining the hard cost of the Software and projecting a reasonable revenue impact.

The purpose of this paper is to provide guidelines for quantifying the hard costs as well as the hard benefits, and the soft competitive benefits that are important in developing a complete picture of the total Return on Investment for the AutoMATE Food Facility Design Software System.

### Design Productivity

Improving Productivity is critical in reducing the overall cycle time in the design process and is influenced by two major factors: Product Performance and Operator Performance.

Product performance generally refers to improvements in the speed of a program's major operations. Operator performance is defined by the timesaving that is derived through improved usability and automated features. AutoCAD applications such as AutoMATE can improve Product Performance in the design process indirectly through improvements in User Interface, Enhanced Commands, and User Ergonomics. Enhanced features that improve Operator Performance, however, can often have a more significant impact on overall productivity than the performance increases derived from improvements in Product Performance.

### Operator Performance - Establishing a Metric

Many metrics have been developed for evaluating the performance of the basic aspects of AutoCAD - file I/O, screen display, object selection, draw/edit, etc. But the best metric for a program such as AutoMATE is not in individual procedures, but in the productivity gains over the entire design cycle of a compete foodservice facility design project, from project setup through rough-ins, elevations, schedules, etc.

Foodservice facilities span a broad spectrum, from snack bars and cafes to multi-facility casinos and theme parks. So establishing an appropriate metric for AutoMATE involved considerations to make sure it was large enough to test a wide array of functions but small enough to complete in a reasonable period of time.

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*What's the bottom line? What benefits can I expect for my investment in time and money?*

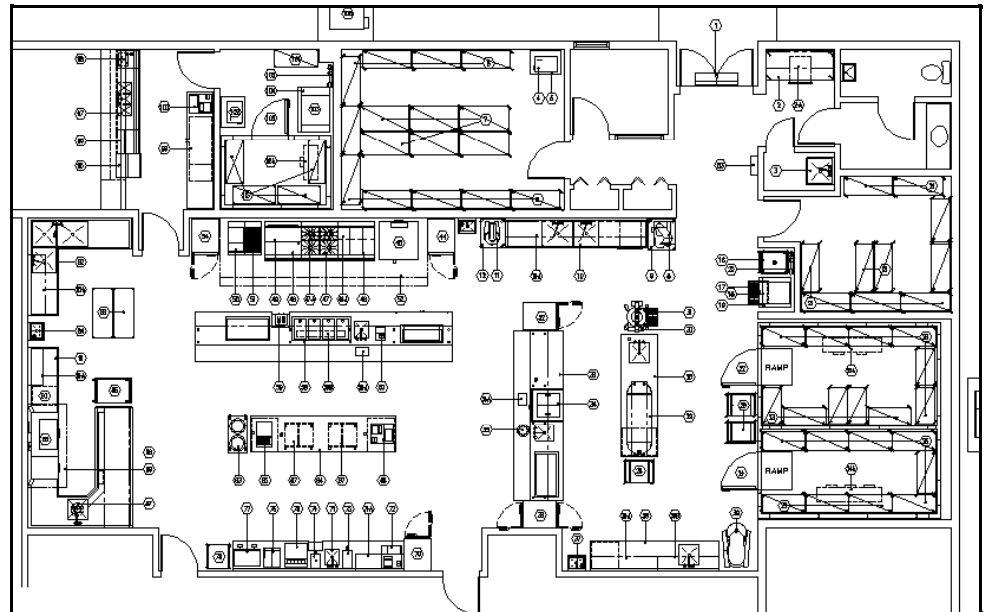
*What increases in speed and productivity can I expect by using AutoMATE.*

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For our test suite, we established a large, full-service restaurant kitchen and service bar as shown below. The basis of the metric: prepare two sets of drawings for the test facility, one using only the tools found in AutoMATE, the other using any other available tools including symbol libraries, templates, spreadsheets, etc.

*Putting AutoMATE to the test, we selected an average size food facility project of almost 100 items of equipment.*

*We prepared a full set of drawing 'sheets' two ways: first using only AutoMATE and then using symbol libraries and any other tool we could find except AutoMATE.*



The set of drawing 'sheets' to be prepared included all the sheets in a typical set of Construction Documents: Equipment Layout, Equipment Schedule, Plumbing Rough-in, Mechanical Rough-in, Electrical Rough-in, Building Works, and an Equipment Elevation sheet.

The guidelines were developed to isolate and measure functions that relate to the preparation of food facility design documents. A pre-drawn architectural background was used as the starting point along with an equipment plan and a list of the equipment to be used in the layout. The guidelines were further designed to permit the broadest range of tools that might be used in preparation of the non-AutoMATE drawing to insure the most competitive possible comparison.

## Measuring The Results

We ran the tests three times and averaged the results. The times we recorded are as follows:

<b>Activity</b>	<b>Non- AutoMATE</b>	<b>w/AutoMATE</b>
Equipment Layout	203 - mins	168 - mins
Tagging	96	22
Equipment Schedule	151	1
Electrical Rough-ins	142	21
Plumbing Rough-ins	132	27
Mechanical Rough-ins	17	3
Equipment Elevations	164	31
Building Conditions	77	14
<b>TOTALS</b>	<b>982</b>	<b>287</b>
	(16-h 22-m)	(4-h 47-m)

The Productivity increase of using AutoMATE vs. the use of various commercial symbol libraries plus any other tools that might be available is a straightforward calculation:

$$\left( \frac{\text{NonAmate} - \text{AutoMATE}}{\text{NonAmate}} \right) = \left( \frac{982 - 287}{982} \right) = \text{AutoMATE is 71\% Faster}$$

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*Expanded to a regular 40-hour week, these times yield a savings of up to 28.3 hours a week depending on the percentage of time you use AutoMATE.*

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This result is based on a comparison of the total times required to complete all the tasks listed in the Activity column. Your typical work profile, however, may not require all of these tasks. If, for example, you do not usually prepare Equipment Elevations, the bump in performance is 70%. We looked at various combinations of tasks and found a range in performance increase from about 58% to 71%. And when individual tasks were compared, the performance boost often exceeded 80%!

This increase in productivity can also be expressed as a ratio of the times being compared - which is computed by dividing the total time of one method by the total time of the other. As a ratio, the speed of using AutoMATE compared to using available symbol libraries and other tools is almost **3.5:1**, or about *three and one-half times as fast*.

### **Productivity and Return on Investment**

Determining overall CAD Productivity and Return on Investment is not as simple as a head-to-head comparison of speed. Many other factors must be considered and entered into the equation. But even deciding on the equation (formula) to use can be a confusing task.

We believe a formula developed in 1990 by Autodesk, the publisher of AutoCAD, is an excellent tool for calculating return on investment for CAD software. A primary value of this formula is that it clarifies the often confusing relationship between the cost of products, labor, training, and productivity.

#### **Formula for Calculating Return on Investment**

- Let A = Cost of Hardware and Software
- Let B = Monthly Labor Cost
- Let C = Training Time in Months
- Let D = Productivity Loss During Training
- Let E = Productivity Gain After Training

$$\frac{\left( B - \left( \frac{B}{1 + E} \right) \right) \times (12 - C)}{A + (B \times C \times D)} = \text{Return on Investment}$$

Our first calculation will be based on an example that involves a full-time CAD operator who earns \$45,000 a year. The CAD operator is using AutoCAD R14 or later so there will not be any hardware cost. The CAD operator will need three days of training in AutoMATE at \$700.00 per day. We'll also assume that the CAD operator will spend a month after the training familiarizing themselves with the software and becoming proficient in its use.

During this one month, the operator will be 25% less productive than normal. But following the one month period the CAD operator is now 35% more productive than before. (Let's assume that the CAD operator spends only about half of his time using AutoMATE. The other half is spent on jobsite visits, project research, meetings with clients, etc. So for the purpose of this analysis, we'll assume that the 70% increase in CAD speed will result in a 35% increase in actual operator productivity.)

Using these assumptions, it is now a straightforward task to calculate the expected return on investment. Using the above formula and the variables outlined above, we can compute the following:

**Case 1 - CAD operator Using AutoCAD R14 or later**

A = Cost of Software and Training = \$1500 + \$2100 = \$3600.00

B = Monthly Labor Cost = \$3300.00

C = Training Time in Months = 1

D = Productivity Loss During Training = 25%

E = Productivity Gain After Training = 35%

$$\frac{\left( \$3,750 - \left( \frac{\$3,750}{1 + 0.35} \right) \right) \times (12 - 1)}{\$3,600 + (\$3,750 \times 1 \times 0.25)} = 230\%$$

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*Based on a 50% usage factor and a labor cost of \$18.00 per hour, the payback time for AutoMATE is less than 3 months.*

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As noted above, this calculation is based on the CAD operator spending only 50% of his time using AutoMATE. If he spends 75% of his time using AutoMATE, the return on investment jumps to **300%**. And in subsequent years when the cost of training is no longer in the equation, the return on investment is even higher at **430%** for the 50% user and **560%** for the 75% user.

Our next calculation is based on an independent Food Facility Designer who does all his own CAD work. His net income averages about \$75,000 a year and he currently uses Microstation. In addition to an AutoMATE license, our consultant will need to purchase a full license of AutoCAD at a street cost of about \$3200.00. He will also need three days of training in AutoMATE and we'll also assume that the consultant will spend a month after the training familiarizing themselves with the software and becoming proficient in its use. Although our consultant spends about 75% of his time using his CAD program, much of that time is spent in planning and layout, so we'll adjust his productivity gain to 25%. Based on these assumptions, we can calculate the following:

**Case 1 - Consultant using Microstation**

A = Cost of Software and Training = \$3200 + \$1500 + \$2100 = \$6800

B = Monthly Labor Cost = \$6250.00

C = Training Time in Months = 1

D = Productivity Loss During Training = 25%

E = Productivity Gain After Training = 25%

$$\frac{\left( \$6,250 - \left( \frac{\$6,250}{1 + 0.25} \right) \right) \times (12 - 1)}{\$6,800 + (\$6,250 \times 1 \times 0.25)} = 160\%$$

Although the additional cost of the AutoCAD license has substantially reduced the return on investment for the consultant, it is a one-time cost factor. In subsequent years when training and the purchase of AutoCAD and not part of the equation, the return on investment for an AutoMATE Subscription License is over **450%**.

## Beyond the Numbers

Clearly, AutoMATE can substantially improve your productivity through the speed delivered by its automated design features. But your gains in CAD productivity don't stop there. Several AutoMATE features drive further productivity increases in ways that are difficult to measure.

### Improved Accuracy - Fewer Errors

Checking a set of CAD drawings for errors is a tedious and difficult task at best. Comparing layouts, schedules, rough-ins and other drawings to make sure that the content of each drawing is coordinated with that of all the others is both time-consuming and error-prone.

AutoMATE includes both active and passive tools to help eliminate errors from your drawings. Major Construction Documents phase tools include built-in error checking: The Rough-in and Schedule commands automatically check for un-tagged items and warn if any are found - they'll even show you which items have been missed. And there are commands to explicitly check for any utility connection points that have not been roughed-in.

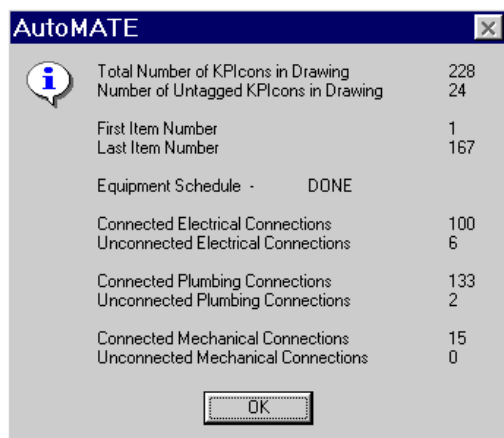
Equipment and Rough-in Schedules and Notes are created by scanning the equipment symbols, not tags or bubbles - schedules created from bubbles are just that: bubble schedules, not equipment schedules. And AutoMATE equipment schedules visually indicate connection points that have not been roughed-in.

Rough-in programs scan every every tagged item for connection points that don't have a matching rough-in service. The only way an AutoMATE User can miss a connection point is to manually by-pass it.

### More Effective Manpower Utilization

An AutoMATE project drawing file maintains a vast amount of information about the 'status' of the project within it's database. It essentially knows what drawing phase is in progress and how much work in each phase has been accomplished. So anyone in your CAD department can pick up at any point and complete a drawing. Loss of productivity because of employee turnover and illness is reduced to a minimum.

There's even a **Drawing Status** command that scans the entire drawing database and displays the current status of each major drawing phase; it lists how many items have not been tagged or roughed-in, whether a schedule has been created, and even displays the total number of items on the drawing.



## **Improved Drawing Coordination**

Drawing changes are inevitable. But AutoMATE's **Global Edit** program makes changes less of a hassle and insures that all related data is modified. Rough-ins, equipment and utility schedule items, notes, and equipment symbols are all cross-referenced.

Use **Global Edit** and select any object on the drawing that refers to the data to be changed. Select a voltage item on a schedule, for example, and any changes you make are also reflected on the rough-in, the equipment symbol, rough-in notes, etc. If you changed the voltage on an item having a cord-and-plug connection from 120-volts to 208-volts, even the rough-in symbol will be changed. **Global Edit** virtually eliminates disparities between rough-ins, schedules, and notes.

AutoMATE also includes a **Check Schedule for KPI con Coordination** that checks the drawing for untagged items, tags without associated symbols, tagged items missing from schedule, and schedule entries without associated equipment symbols. And this command can be set to run each time a drawing is opened, quickly identifying any errors.

## **Competitive Benefits**

The CAD standards built into AutoMATE simply produce a higher quality product. And the User customization features let you 'tune' AutoMATE to give your drawings a custom look. Your drawings demonstrate a high level of competence to your clients, whether they are Owners, Operators, or Architects.

Rough-in drawings created with AutoMATE are often adopted by project engineers as the foundation for their own drawings. Indeed, we've had many reports of electrical engineers simply adding their own information to an AutoMATE rough-in plan.

If you use the 3D features of AutoMATE, you gain an even greater edge over your competition. A perspective view or rendering provides an added level of understanding of your design intent that simply can't be derived from a set of 2D drawings. Clients keep coming back for a service they can't find anywhere else.

## **Do Your Own ROI Calculations**

The times used in our ROI calculations were generated from an 'all-out' effort - the kind you're likely to need when facing a deadline. The formula we used for these ROI calculations is available in the form of an Excel spreadsheet on the Autodesk website. If you'd like to do your own calculations using your own assumptions for software cost, training, and productivity variables, you can download the ROI spreadsheet from [www.autodesk.com](http://www.autodesk.com).

## **Summary**

The bottom line is that whether you are a Foodservice Equipment Dealer or Food Facility Designer or Foodservice Consultant, using AutoMATE for the CAD production of your Food Facility Design documents is a smart idea. It substantially reduces cost by reducing the time required to prepare the documents, and it increases the value of those documents through improved accuracy and content. Implementing AutoMATE in your CAD department can provide a competitive advantage that cannot be gained through any other means.

## What AutoMATE Users Say

A Return on Investment analysis is only part of the story about the true usefulness of any tool. There are other considerations to look at - ease of use, completeness of the toolset, learning curve, etc. Listen to what some of our Users have to say about these topics...

AutoMATE? Couldn't do what we do without it!

*James LaValle, Clevenger Frable LaValle, White Plains, NY*

Our two AutoMATE stations are used 8 hours plus, 5 days a week and are easily obtaining a 3 to 1 work ratio. AutoMATE is the cutting edge in automated software in our industry. AutoMATE is what CAD is all about, truly automated Computer Aided Design.

*Dennis Ford, Strategic Equipment - Scruggs, Knoxville, TN*

I could not have had the success that I have had without AutoMATE. It has allowed me to do the work of three people from day one. It is a very user friendly product. I love to design and work with my clients but I don't particularly like doing rough-ins and details. AutoMATE is particularly wonderful for these tasks.

*John Mace, Mace Murphy Design Group, Walnut City, CA*

AutoMATE is a must for anyone serious about producing Food Service drawings and submittals on AutoCAD. The most user friendly software we have used, period.

*Scott Allard, San Angelo, TX*

As someone involved in Foodservice Design, I find AutoMATE a central and time saving element in the layout and design of Foodservice facilities. There are no other products on the market which can compare to the speed and accuracy of which I can do layout and revision drawings, as well as generate project proposals, specifications, and cost estimates from a single drawing, which is also "3D Render Friendly".

*Eric Gelfond, TriMark United East, MA*

Never could I have anticipated how powerful AutoMATE is and how productive its capabilities can be. Thanks again for all the support and guidance you have given me over the past years... You have made the learning of these complex systems fun and easy.

*Joseph J. Merlino, Merlino Associates, West Palm Beach, FL*

Changing to AutoMATE from straight AutoCAD has increased our productivity three fold. AutoMATE takes the Consultant through the design process methodically, which results in superior construction and bid documents.

*Dan Murphy, 20th Century Design, Las Vegas, NV*

My projects are mostly conceptual, therefore I don't utilize 100% of the program's capabilities. I do, however, use AutoMATE on 100% of my projects and I would not be competitive without it. AutoMATE is a powerful program and without equal in the industry.

*Robbie Freeman, Compass Group NAD, Atlanta, GA*