FabTime Cycle Time Management Newsletter

Volume 19, No. 5 **December 2018**

Information

Mission: To discuss issues relating to proactive wafer fab cycle time management

Publisher: FabTime Inc. FabTime sells cycle time management software for wafer fab managers. New features in development right now include support for fiscal calendars (e.g. to report by work week) and addition of goals to stacked performance charts.

Editor: Jennifer Robinson

Contributors: Jay Maguire from Renesas Electronics

Keywords: OEE; Tool Availability; Personal Productivity

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Welcome

Welcome to Volume 19, Number 5 of the FabTime Cycle Time Management Newsletter. We hope that those of you in the US had a relaxing Thanksgiving holiday and we wish everyone a joyful holiday season and a happy and productive 2019. March will mark the 20th anniversary of FabTime as a company, and we are grateful for all of the colleagues, customers, newsletter subscribers and friends that we've made over that time.

In this final newsletter issue of the year, we have an announcement regarding our successful OEE webinar. Our FabTime tip of the month is about using a new feature to rotate charts by 90 degrees. We have one response to our previous issue's main article about the proposed metric delta to moves goals. Our new main article contains tips for sending more productive emails, inspired by some discussion at the October Fab Owners Alliance meeting. We welcome your feedback and thank you for reading, as always.

Thanks for reading – Jennifer

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Community News/Announcements

FabTime OEE Webinar A Success

On October 23rd, FabTime's Mike Krist hosted a specialized webinar for FabTime customers on understanding OEE concepts. The webinar was a success, with approximately 40 people participating (and others viewing the webinar later from the archive). Topics for the webinar included:

1. Understanding *why* and *when* we should use Overall Equipment Efficiency (OEE).

2. Understanding definitions – Availability Efficiency, Rate Efficiency, Rate Loss, etc.

3. Computing OEE for simple examples with Excel.

4. Using FabTime OEE charts, and replicating the results in FabTime with Excel.

5. Investigating rate loss on FabTime OEE charts.

6. Listing the data sources necessary to compute OEE, and understanding the challenges of OEE (including cluster tool OEE).

An archived version of the webinar may be viewed by FabTime customers. Previous webinars are also available:

- Introduction to Using FabTime (for new users)
- Tool State Analysis Using FabTime
- Testing and Taking Advantage of Patch108

Contact FabTime for links to archived versions of the previous webinars. (These links will be included in future software patches, available from the Help toolbar.)

FabTime welcomes the opportunity to publish community announcements, including conference notices and calls for papers. Send them to newsletter@FabTime.com.

FabTime User Tip of the Month

Rotate Charts to Switch X and Y Axes

Starting in Patch 110 (available now for installation on production servers), FabTime allows you to rotate any chart by 90 degrees to essentially switch the X and Y Axes. To do this:

1. Generate your chart of interest. A good example for this is the new Tool State Gantt Chart (filtered to display some relatively small number of tools). This chart displays the E10 tool state over time for each tool. An example, filtered to display 10 Nitride Deh tools, is shown in Figure 1 on the next page.

2. From either the Chart page or the Home page, click on the R> in the lower-left-hand corner of the chart itself. This tells FabTime to change the chart's orientation

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from horizontal bars (in this case) to vertical bars as shown in Figure 2 on the next page.

3. Click on the "R" again to return the Gantt chart to its usual horizontal bar orientation. Note that most charts in FabTime default to vertical bars. Clicking on the R for any of these charts will rotate the chart so that you'll see the left-hand axis running across the top of the chart (and the right-hand axis, if used, across the bottom of the chart. An example of a rotated WIP Pareto chart is shown in Figure 3, on the next page.

We hope that you will find both the new Tool State Gantt chart and the chart rotation capability useful. If you do not see these options on your FabTime server, please contact your internal FabTime system administrator to ask when Patch110 will be installed at your company.

Subscribe to the separate Tip of the Month email list (with additional discussion for customers only) here: http://www.fabtime.com/tip-of-the-month.php (note new link). Thanks!

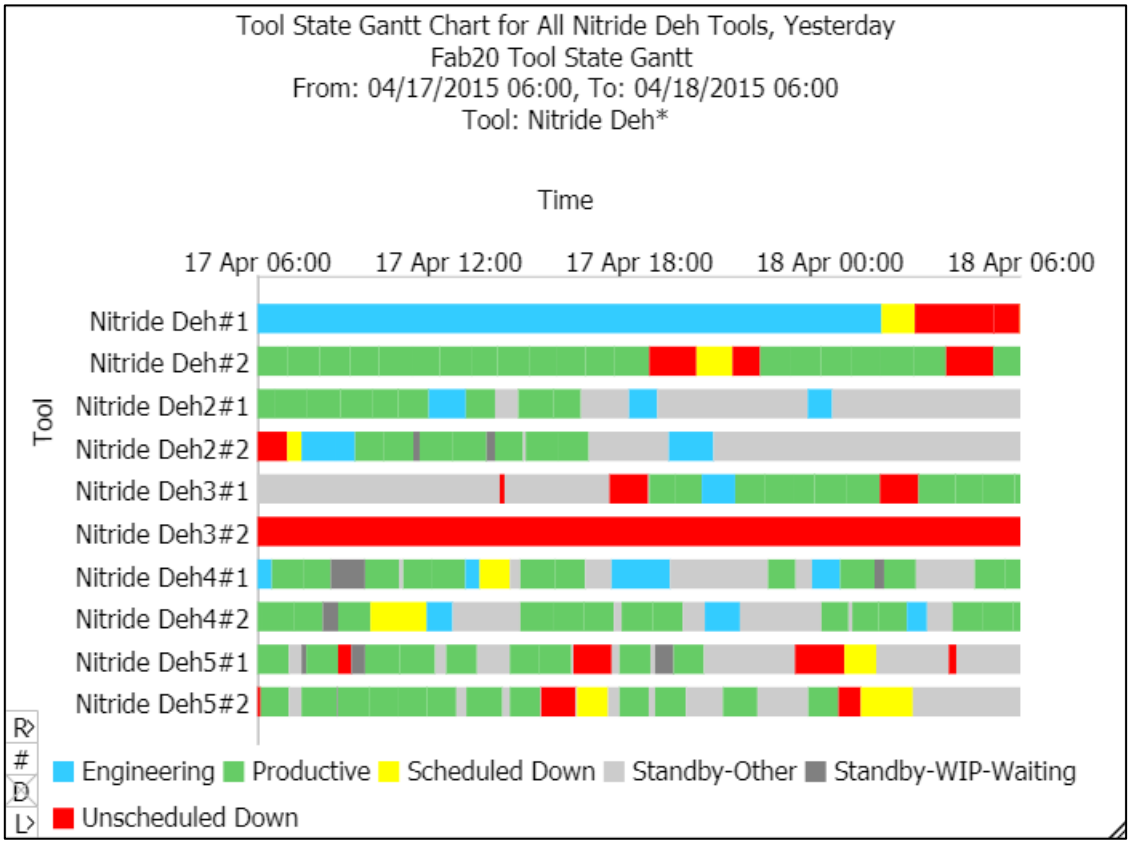

Figure 1. Example of New Tool State Gantt Chart in Default Horizontal Orientation (for this chart)

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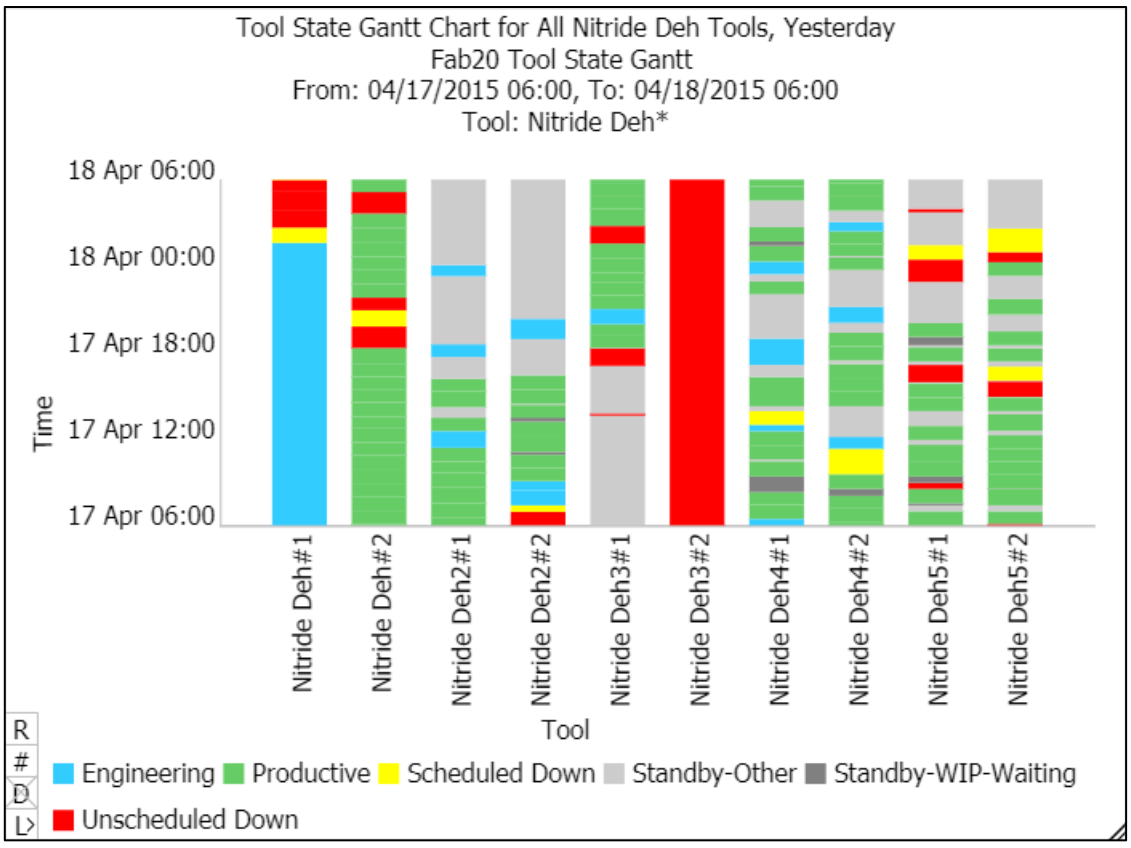

Figure 2. Example of New Tool State Gantt Chart Rotated to Vertical Orientation

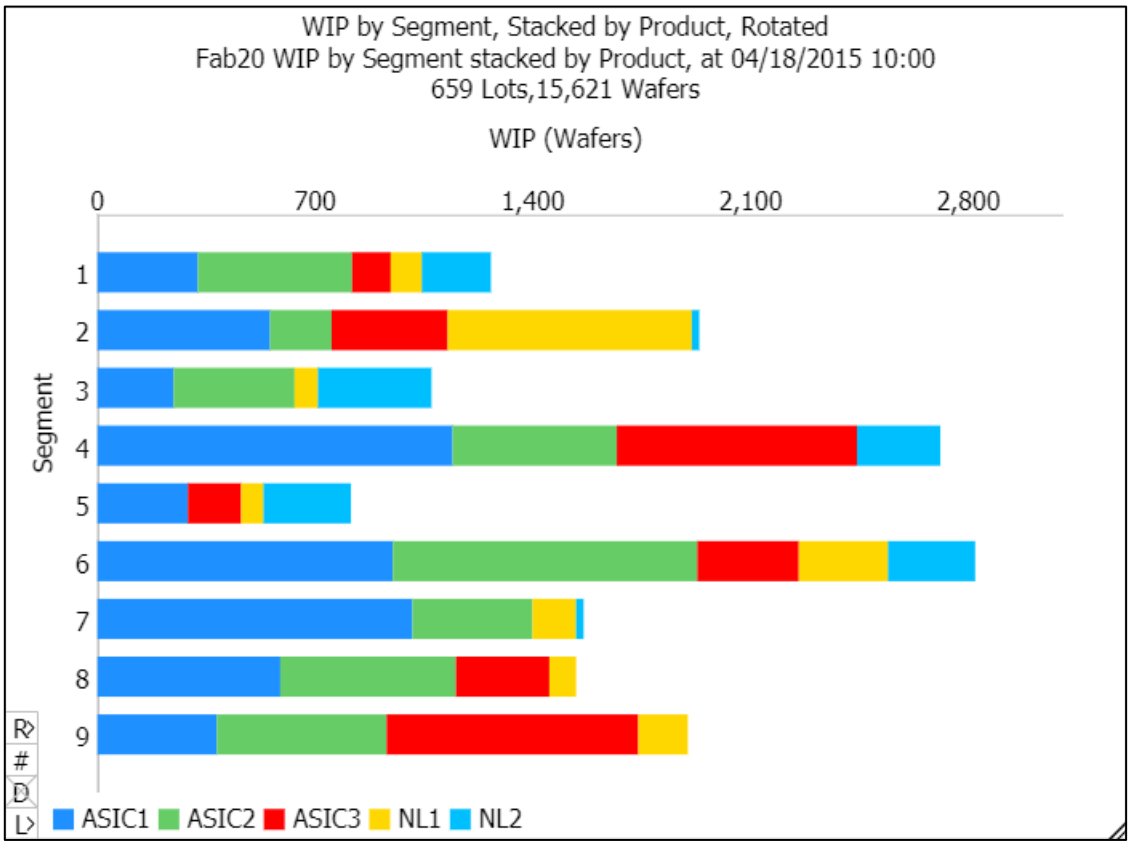

Figure 3. Example of WIP Stacked Pareto Chart Rotated to Horizontal Orientation

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Subscriber Discussion Forum

Issue 19.04: New Delta to Moves Goal Metric

Jay Maguire from Renesas Electronics wrote in response to the main article in *Issue 19.04: A Possible Metric Regarding Delta to Moves Goal*, giving us exactly the sort of feedback that we were looking for to this new proposed metric. Jay said:

1) It might be interesting to look at delta moves by operation or zone as well as by tool, area and overall. The prior being, since variation is cumulative, we would expect least variation in Zone 1 increasing to highest variation in the last zone? Maybe you could even estimate how much overall variation and cycle time would improve from reduced variation in Zone 2 or starts versus Zone 10, for example? Variation late in the flow is probably less impactful overall than variation early in the flow. It could get noisy and 'covaried' but I might try it, maybe for a specific technology.

2) The delta data also gives you a picture of the distribution of your misses (errors). If it's really 'normal' looking, standard deviation might be a good metric but I'm not sure it's normal. I think the worst days are significantly farther below the target than the best days are above it. Maybe this is more apparent in a small fab like ours where one catastrophic incident has a bigger impact.

3) I like the trend version more than the cumulative version because you can see the variation more clearly. Both have value. I like the starting or average WIP being included too.

FabTime Response: You could certainly generate separate charts for different Zones (we call these Segments in FabTime, linear chunks of the process flow). We agree that the last Zone would probably have higher variation than the first Zone, but that efforts to dampen variation early in the line would be likely to have the most impact.

We also agree that the distribution of misses from goal might well not be normal, especially in smaller fabs, due to the impact of major incidents (such as a long downtime on a key one-of-a-kind tool). For a larger fab, performance to move goals is probably more consistent from day to day. But in all cases, it seems like taking a look at the data could be useful.

Thanks for your feedback regarding the different possible forms of this chart. We will continue discussing this internally before deciding what changes to make, if any, to FabTime to reflect this. Meanwhile, if any other readers have thoughts about the Delta to Moves Goal charts introduced in Issue 19.04, we would appreciate your feedback.

FabTime welcomes the opportunity to publish subscriber discussion questions and responses. Simply send your contributions to Jennifer.Robinson@FabTime.com.

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Tips for Sending More Productive Emails

By Jennifer Robinson and Frank Chance, FabTime

Jennifer had a discussion with a few people at the recent Fab Owners Alliance meeting in Gresham, Oregon about email. Several people expressed dissatisfaction with the volume of email that they receive and the corresponding difficulty of distilling urgent issues from the cascade of routine messages. This is something that Jennifer and Frank, like most managers, struggle with every day. We thought it might be useful for us to share a few recommended best practices for email senders to create more productive emails.

We have also seen various recommendations from productivity improvement specialists for managing your own incoming email (only check email three times a day at scheduled times, etc.), However, it's our opinion that what's relevant there depends highly on each person's job. Our tips for *sending* more productive emails, however, are more general, and are our focus here.

Tip #1: Highlight Points in Need of Response

Our first tip comes courtesy of our Director of Engineering, **Lara Nichols** (who naturally weeds her way through many emails each day). What Lara started doing was highlighting in yellow the key point or question in some of her messages. She especially does this when there is a long email with considerable background and she has a specific question for which she needs a response. This lets us focus on the question, read the supporting information as needed, and respond accordingly. It saves us time, and reduces the chance that we will skim through the email and miss the question altogether.

We have started doing this highlighting ourselves. We mainly use this technique in certain internal emails, but we do sometimes use it in emails to our customers about ongoing matters. We wouldn't necessarily recommend using this method for emails to new people, such as sales-related emails, as it could come across as overly demanding or attention-seeking. But for people with whom you regularly communicate, it's a great way to focus attention on the most important thing. [And yes, of course you should write shorter emails in the first place, so that a higher percentage of the content is focused on the most important thing, but some context is often necessary.]

We're not saying that you need to find and highlight the most important point in every message that you send. That would be like sending all of your messages set to "high priority" - annoying and resulting in nothing being seen as important. But if you need a certain response or action from someone on your team, using some judicious highlighting to make just that part of your message stand out can be very helpful.

Tip #2: Send Evidence-Based Examples

This second tip is something that Frank looks for in technical emails that he receives about problems: evidence-based examples. Frank says: "Rather than saying "I checked the production server and it doesn't have this problem", I'd like to see a screen snapshot that includes the URL, so we can easily confirm it's the production server, and a graph or data table showing the problem does not exist. And I'd like annotations on the screen snapshot, e.g. a circle around the server name with a note confirming it's the production server, and a circle around the data item of interest on the chart or data table, and *why* this shows that the problem does not exist. That way I can read the email, glance at the screen snapshot, and feel confident that the problem truly does not exist on the production server."

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Similarly, of course, he would like to see evidence-based examples that DO show the problem. Rather than attempting to type an error message, he suggests that you take a snapshot of the error message with any associated details captured. If an error is repeatable, by all means go back and take a series of snapshots showing what you did and how the error occurred. It's very easy, in describing something, to miss some key detail.

Jennifer has learned to do this when testing our software. Instead of saying: "Hey Frank, this new feature generated an error when I did X", she tries instead to include a snapshot of X, and then a snapshot of the error. The process of going back to find the evidence also helps her to ensure that she understands exactly what happened. It's simply not useful for any tech support person to hear about a problem in vague terms, with no way to replicate it. [Jennifer still cringes over the time she insisted to her ISP that her husband's email account wasn't working, only to learn that she was mistyping part of the email address and then using autocomplete to repeat the error.]

We would also like to insert a plug for a software add-on that we find invaluable. Our entire team uses the SnagIt screen capture utility from TechSmith (https://www.techsmith.com/screen-capture.html, available for Windows and Mac). SnagIt lets you capture any portion of your screen, including scrolling windows, and then takes you to an editor where you can annotate your capture. This is a great way to send step-by-step instructions to someone or to capture an image of some problem and include all of the associated detail. Of course there are other ways to capture screen shots, but we do find that SnagIt makes the process easy. And since we want to see those evidence-based examples, it is a key tool for our team. [And no, we won't get a commission if you buy it - we just think that you may find it useful.] An example of the evidence from a recent round of internal software testing, generated using SnagIt, is shown in Figure 4 below.

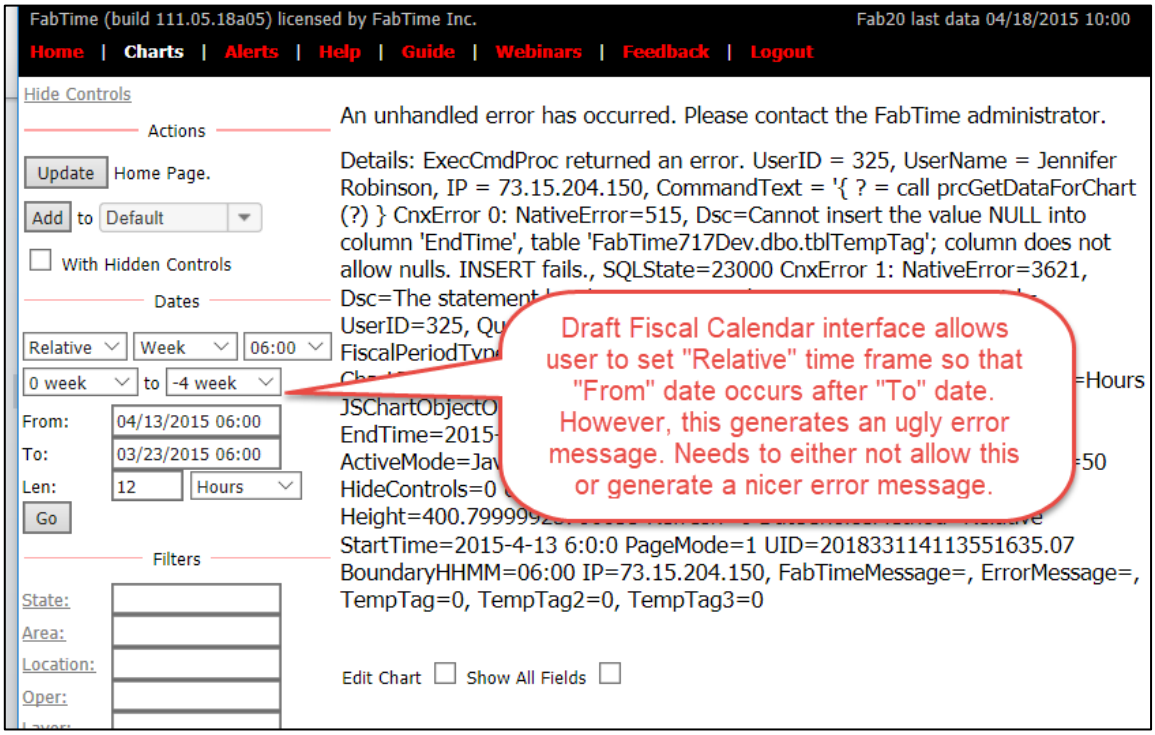

Figure 4. Evidence-Based Example from Recent Software Testing

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Tip #3: Actively Manage Different People in the Same Discussion

Are you ever in the situation where the focus is shifting from one person to another in the same email thread? For example, it's fairly common for a newsletter subscriber to write to Jennifer copying someone else, and asking her to add the new person to the subscriber list. In her response, Jennifer would like to thank the first person for the referral and then shift focus to the second person to tell them that she's added them to list, etc. We also have a similar dynamic on certain technical emails. For example, the site contact might refer us to someone in IT to answer some detailed questions.

Our main advice here is to make it as clear as possible in your message when you are switching from, say, thanking Bob to giving some detail to Carol. An important tip is to make the "thanking Bob" part of the message as brief as possible, so that you still have Carol's attention as she gets past that part. This might be another case where you could use highlighting (even if Carol is a new contact for you); just to make sure that the meat of your message isn't missed by the person for whom it is intended. An example, also generated using SnagIt, is shown in Figure 5 below.

And then (side tip) if there is continuing discussion, you should consider taking Bob off the list. A good general tip for not annoying people with your emails is to cut back on your CC list as much as you can. But policies for this will vary by company.

Tip #4: A Short Call Is Better Than a Bunch of Emails

This tip is also courtesy of Lara, included in an email that she sent to the FabTime technical team regarding coverage over Thanksgiving. Many of us within the engineering community tend to be introverted. A known trait of introverts is a

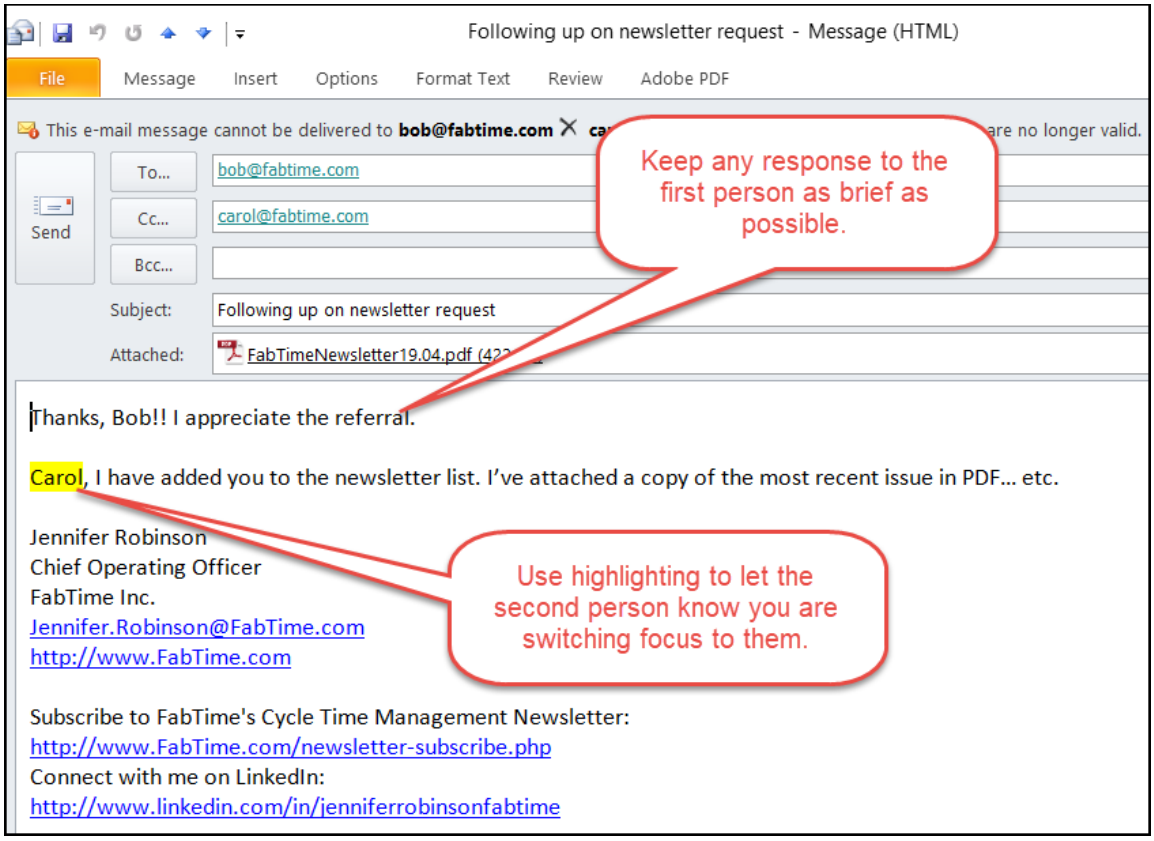

Figure 5. Example of Transitional Email

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resistance to talking on the phone. Many of us also like email for the inherent paper trail and the fact that composing an email gives us time to organize our thoughts. However, Lara is right that exchanging a flurry of emails or text messages can be much less efficient than just picking up the phone for a quick call, especially when it comes to resolving a problem or getting a decision made.

A related point regarding calling vs. emailing is that it's not a good idea to use email for urgent situations. If there is a major issue in the fab, sending an email to the manufacturing manager who is home for the night might not be the best path to assistance. It's not reasonable to expect people to be checking their emails 24 hours a day, though your company might have an expectation of answering a phone call or page. Texts, we would estimate, fall somewhere in the middle on this matter.

Conclusions

There are, of course, alternatives to email these days. Some companies use Slack, while others expect people to be available on instant messaging. Families and friends are communicating via Facebook, Facetime, and texts. Voicemail seems to be on the way out, especially for younger people. But as far as we can see, email is still hanging in there, necessary and useful but also taking up a huge chunk of people's days. It's our belief that anything people can do to make the emails that they send more productive will be appreciated by their co-workers and customers, and will help their companies to be more successful overall. Less time spent on email = more time spent doing actual work.

In this article we have shared a few tips for making the emails that you send a bit more useful to your recipients. These are things that we teach to our new employees and methods that we use in sending messages to our customers. We hope that you find some of them useful and we welcome any suggestions that readers might have for us.

Closing Questions for Newsletter Subscribers

How do you make your emails more productive? Have you done anything to reduce the amount of email that your staff sends or receives? Do you use Slack? Instant messaging? Texting? Or does email still rule at your company? If you regularly receive email from FabTime, is there anything we do that is annoying and that we could improve? Please do let us know!

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- Micron Technology, Inc. (132)
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- Maxim Integrated Products, Inc. (97)
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- Honeywell (30)

Top 3 subscribing universities:

- Ecole des Mines de Saint-Etienne (EMSE) (14)
- Arizona State University (9)
- Virginia Tech (7)

New companies and universities this month:

- Alpha & Omega Semiconductor
- Capco LLC
- Memjet
- National Instruments

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- Abbie Gregg Inc. (2)
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- Compugraphics International Ltd. (1)
- Delphi Delco Electronics Systems (1)
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- FormFactor (2)
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- Hewlett-Packard Company (15)
- Hitachi HHTC (Canada) (1)
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- Indian Institute of Science (2)
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- Saint-Gobain Abrasives (1)
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- Toppan Photomasks (2)
- Veeco Instruments (1)
- Xicato (1)
- Yonsei University (1)

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Cycle Time and Line Yield Improvement Manager
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- Does your factory lack real-time reporting?

FabTime can help. FabTime saves your management team time daily by turning MES data into information, via a real-time web-based dashboard that includes lot dispatching. FabTime saves your IT staff time by breaking the cycle of custom-developed reports. Most importantly, FabTime can help your company to increase revenue by reducing cycle times up to 20% for regular lots, and even more for high-priority lots.

Although FabTime was originally designed for front-end manufacturing, you can use FabTime for your assembly or test facility. You simply need to have a transaction-based manufacturing execution system. FabTime can link to all commercial systems commonly used in the industry (e.g. WorkStream, Promis, Eyelit, Mesa, FactoryWorks) or can link to internally developed systems. FabTime can pull data from multiple databases if needed (e.g. WIP transactions from the MES, tool transactions from another system). FabTime is currently being implemented in two assembly and test facilities, with no major technical hurdles.

FabTime Applicability for Back-End Factories

- FabTime handles lot merging and splitting, with full tracking of overall cycle times.
- All chart quantities (moves, WIP, etc.) can be displayed as die, with data tables formatted for readability of large quantity values.
- Custom assembly and test parameters (applicable to WIP or tool state transactions) can be mapped.
- Custom site-specific reports for wire bond area have been developed for customers (die and component placements, etc.).
- Custom dispatch factors allow for incorporation of back-end-specific data used in dispatch decisions (e.g. availability of boards, and minimization of sequence-dependent setups).

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