FabTime Cycle Time Management Newsletter

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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 the software this month include the New Earned Plan Hours metric and greater detail on elapsed cycle time charts (Process Time, Queue Time, Hold Time, and Other Time)

Editor: Jennifer Robinson

Table of Contents

- Welcome
- Community News/Announcements
- FabTime User Tip of the Month – Dynamically Search FabTime
- Subscriber Discussion Forum
- **Main Topic – Why Should Foundries Care about Cycle Time?**
- Keywords: Financial Impact of Cycle Time
- Current Subscribers

Welcome

Welcome to Volume 14, Number 3 of the FabTime Cycle Time Management Newsletter! In this issue, we are pleased to announce that the registration form for the first FabTime User Group meeting is now available. We also have a FabTime installation success story from one of our customers, and a call for papers for the 2013 APC Conference. Our FabTime user tip of the month describes the new dynamic search feature on the FabTime charts page. We have no subscriber discussion this month.

In our main article, we address a question raised by a new newsletter subscriber: Why should foundries care about improving cycle time? While acknowledging that cycle time motivations for pure-play foundries may be different from those of independent device manufacturers (IDMS), we propose several reasons why foundries should be focusing on cycle time improvement also. We welcome your feedback.

Thanks for reading – Jennifer

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Community News/Announcements

User Group Registration Form

The registration form for the first-ever FabTime User Group meeting is now available. The meeting will be held September 18th and 19th (1.5 days) at Atmel's campus in Colorado Springs. The meeting will provide our software customers with the opportunity to:

- Learn about how other fabs are using FabTime to improve their operations;
- Understand new software features;
- Review and comment upon FabTime's roadmap; and
- Network with FabTime staff and colleagues from other customer sites.

You can sign up on FabTime's website. The meeting is only open to employees at FabTime customer sites. There is no cost to attend. We are also accepting proposals for customer success stories and/or panel discussions. We have two speakers lined up already, and room for more! As this is our first User Group meeting, we are eager to learn from our customers what they will find most useful. We hope to see you there!

FabTime Installation Success Story

We are pleased to share a FabTime installation success story this month. One of our new customer sites, International Rectifier in Mesa, AZ, just replaced their internally developed Daily Report with FabTime's reporting system. The site estimates that they are routinely saving approximately 7 hours per week (time previously spent generating reports and feeding them into an Excel spreadsheet), in addition to "countless hours in troubleshooting the old Daily Report."

We are, of course, delighted to hear this from the Mesa site, and appreciate their willingness to share this success story.

Call for Papers: APC Conference 2013

The APC Conference XXV 2013 will be held October 14-17 at the University of Michigan in Ann Arbor. The APC Conference will address Advanced Process Control needs and solutions for high volume manufacturing in the semiconductor and other related industries. Here is an abridged version of the call for papers:

"This call for papers is directed to Integrated Circuit (IC) and related industries. Manufacturers, equipment suppliers, software solution providers, sensor, and metrology suppliers are all welcome to submit abstracts. Advancements in related industries, such as solar devices, flat panels, LEDs and MEMs, will also be discussed in order to assess how synergy between these industries can be better leveraged. The conference will focus on recent technical advancements, current challenges and future needs in order to assure alignment.

Conference Topics

The conference will be built around topics such as, but not limited to:

- Factory-wide and enterprise-wide applications and deployment
- Data Mining
- APC integration with technologies such as yield management, maintenance management, adaptive scheduling and DFM
- Real-time data collection and data management
- Benefits and justification (ROI, CoO, OEE)
- Equipment productivity data collection/analysis

- E-diagnostics, E-manufacturing, and EEC
- APC applications to back-end semiconductor manufacturing

Important Dates:

- Online abstract submissions open: April 22, 2013
- Abstract submission deadline: July 01, 2013
- Notification of abstract acceptance: August 1, 2013
- Final PowerPoint presentation due: September 20, 2013

More details are available on the conference website.

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

Dynamically Search FabTime

For those of you who have installed FabTime Patch 103 (released in early March), you'll find a small, but highly useful, change on the Charts page. Above the list of charts in the middle of the page is an input box labeled "Search FabTime". As you start to type a word or phrase into this box, FabTime will dynamically display a list of matching charts. For example, typing "OEE" causes FabTime to show the OEE Trend and Pareto charts in the chart list, and hide all of the other charts. This means that if you know what type of chart you are looking for, you can just start typing it at the top of the page, instead of searching the (relatively long) list of chart categories. We already can't live without this feature ourselves - it makes it MUCH faster to generate charts from the chart list.

The search box also shows you additional links at the bottom of the chart list. You'll see a list of matching help articles as well as a list of matching FabTime newsletter articles. Currently these lists are based on the help page and newsletter issue titles only, to keep things fast. Clicking on the link will take you to that help article or html newsletter issue. Again, we have found this to be much faster than going to the help table of contents and searching for something there. We hope that you find it useful!

If you have any questions about this feature, or any questions about the software, just use the Feedback form inside FabTime. Customers can subscribe to the separate Tip of the Month email list (with additional discussion for customers only). Thanks!

Subscriber Discussion Forum

FabTime welcomes the opportunity to publish subscriber discussion questions and responses. Send your contributions to Jennifer.Robinson@FabTime.com. We have no subscriber discussion in this issue. Recent topics have included:

- Hot Lot and Hold Lot Percentages
- The new Earned Plan Hours metric (now available in FabTime)
- OEE

If you have any thoughts on these issues, or any other fab management/productivity related topics, we would love to hear from you.

Why Should Foundries Care about Cycle Time?

A new newsletter subscriber told us recently that his biggest cycle time problem was "Convincing our foundry that cycle time is an important metric to constantly improve." If you are an independent device manufacturer, your reasons to continue improving cycle time are fairly clear. As we wrote back in issue 3.5, these include:

1. Savings in raw material costs due to improved yields.

2. Savings from reduced number of Engineering Change Notices (ECNs).

3. Savings from a lower probability of needing to write off finished goods due to a market shift (due to the need to hold less finished goods safety stock).

4. A one-time benefit in reduced WIP Carrying Cost (money currently held in WIP can be used for other investments).

5. Increased revenue due to increased number of cycles of learning leading to design wins (more competitive products).

6. Increased revenue due to being first to market, because of shorter R&D cycle times (greater market share).

7. Ability to charge a pricing premium after getting new products to market more quickly.

We developed a spreadsheet that interested parties can use to explore the impact of these factors on fab revenue (see our website). Our experiments with that

spreadsheet suggest that items 5 to 7, which are revenue-related, are the more powerful knobs. These revenue benefits, however, don't accrue to the foundry, but rather to the company selling the end product.

So What about the Foundry's Perspective?

If you are a pure-play foundry, you are most likely under tremendous competitive pressure to keep utilizations high, and costs low. You also tend to operate with a high degree of input variability as customer mix changes. But, as readers of this newsletter well know, high utilizations and high variability are both direct causes of high cycle times. So, if you don't stand to reap the upsides that the IDMS do from fast cycle times (particularly from reduced time to market), why should you continue to drive your factory's cycle times down?

Here are a few thoughts to consider:

1. Foundries should care about cycle time improvement because customers care about cycle time improvement. If they have a choice (at a similar cost proposition), your customers will find someone else who can make their product more quickly, at least in the more cutting edge segments of the market. Here, there are tremendous time to market benefits for the customer from achieving better cycle times. And the foundries in this segment are responsible for more of the R&D, which directly affects the time to market considerations. (See Foundry Models in Transition, by Jeff Chappell, link below.)

2. Shorter cycle times will tend to correlate with better on time delivery performance, which directly affects customer satisfaction. The less variability you have in your factory, the lower your cycle times will be, and the better you can predict what your delivery windows will be for individual orders. Better delivery performance will make customers happy (at all segments of the market), and keep them coming back.

3. Longer cycle times may be correlated with poor yields. This ties directly to the bottom line, particularly where raw material costs are significant. See issues 5.01 and 5.02 for details. Longer cycle times also may give your customers more of a chance to request Engineering Change Notices, which require extra resources.

4. In a market with rapidly declining prices, shorter cycle times may be tied to higher revenues (and longer cycle times to lower revenues).

5. In general, the longer you have your customer's product in your factory, the more you are at risk for something to go wrong. What if your customer goes out of business? How are your contracts written if your customers change their mind and don't want the products that you are making anymore? These are uncertain times. Shorter cycle times allow orders to be fulfilled quickly, and invoices sent off promptly. Why wouldn't you want to get end product out the door as soon as you possible can (without making mistakes)?

Conclusions

A quick web search suggests that some foundries are actively advertising on the basis of lower cycle time. (See RF Micro Devices' website, for example). Others, however, seem much more focused on technology capability and price, with no obvious marketing emphasis on cycle time. Our guess is that this is going to change over time, as fabless and fab-lite customers are driven to require ever tighter cycle times. The recent shift by which IDMs like Intel are offering more foundry services will also likely come into play here.

Because many of the benefits to improved cycle time lie on the revenue side (from shorter product life cycles and their contribution to greater market share), pure-play foundries may not face the same level of pressure that IDMs do to keep decreasing cycle times. However, there are a number of reasons why shorter cycle

times will benefit foundries too, as discussed above. Certainly shorter foundry cycle times will benefit foundry customers. And isn't that ultimately what business is all about?

Closing Questions for Newsletter Subscribers

If you are a foundry customer, have you had trouble with your foundry's cycle time performance? If you are a foundry, do you try to position yourself in terms of cycle time, or do you focus mainly on costs, technology, and yield?

Further Reading

J. Chappell, Foundry Models in Transition, *Semiconductor Manufacturing and Design Community*. April 18, 2013. http://semimd.com/blog/2013/04/18/not-your-fathers-chip-foundries/.

Gartner, "Worldwide Semiconductor Foundry Market Grew 16.2 Percent in 2012, According to Final Results by Gartner," New Release, April 24, 2013. http://www.gartner.com/newsroom/id/2447915

J. Robinson and F. Chance, "The Bottom Line Benefits of Cycle Time Management." *FabTime Newsletter,* Volume 3, Number 5, 2002.

J. Robinson and F. Chance, "Cycle Time and Yield," *FabTime Newsletter*, Volume 5, Number 1, 2004.

J. Robinson and F. Chance, "Cycle Time and Yield Revisited," *FabTime Newsletter*, Volume 5, Number 2, 2004.

Yi-Nung Yang and Shi-Chung Chang, "A Contract of Purchase Commitments on Shared Yields as a Risk-Sharing Mechanism among Fabless-Foundry Partnership", *Proceedings of the 2008 Winter Simulation Conference*, Miami, FL, December 7-10, 2008. Available from http://informs-sim.org/.

Subscriber List

Total number of subscribers: 2795, from 438 companies and universities.

Top 20 subscribing companies:

- Intel Corporation (148)
- Maxim Integrated Products, Inc. (139)
- International Rectifier (120)
- Micron Technology, Inc. (117)
- Texas Instruments (81)
- Carsem M Sdn Bhd (76)
- GLOBALFOUNDRIES (69)
- Fairchild Semiconductor (67)
- X-FAB Inc. (66)
- ON Semiconductor (65)
- TECH Semiconductor Singapore (59)
- Western Digital Corporation (59)
- STMicroelectronics (56)
- Analog Devices (52)
- IBM (51)
- Infineon Technologies (49)
- Freescale Semiconductor (48)
- Skyworks Solutions, Inc. (47)
- Seagate Technology (39)
- Cypress Semiconductor (35)

Top 4 subscribing universities:

- Ecole des Mines de Saint-Etienne (EMSE) (13)
- Arizona State University (8)
- Nanyang Technological University (8)
- Virginia Tech (7)

New companies and universities this month:

- Innovative Global Services & Solutions (IGSS)
- EPC
- Politecnico di Milano

Sampler Set of Other Subscribing Companies and Universities:

- BAE Systems (23)
- Ching Yun University (1)
- Globitech (1)
- ICF Consulting (1)
- Indian Sugar + General Eng. Corp. (1)
- iSky Factory Automation (1)
- KLA-Tencor (9)
- Macronix International Co. (2)
- Mazik Media (2)
- MTS Systems (1)
- Oregon State University (1)
- PriceWaterhouseCoopers (1)
- ScheduleSource (1)
- SEMI (1)
- Singtel (1)
- Solexant (1)
- Triniti Corporation (1)
- University of Limerick (2)
- Wright Williams & Kelly (3)
- Yonsei University (1)

Note: Inclusion in the subscriber profile for this newsletter indicates an interest, on the part of individual subscribers, in cycle time management. It does not imply any endorsement of FabTime or its products by any individual or his or her company.

There is no charge to subscribe and receive the current issue of the newsletter each month. Past issues of the newsletter are currently only available to customers of FabTime's web-based digital dashboard software or cycle time management course.

To subscribe to the newsletter, send email to newsletter@FabTime.com, or use the form at www.FabTime.com/newsletter.htm. To unsubscribe, send email to newsletter@FabTime.com with "Unsubscribe" in the subject. FabTime will not, under any circumstances, give your email address or other contact information to anyone outside of FabTime without your permission.

FabTime® Cycle Time Management Software

"Instead of spending time preparing reports, shift facilitators can get the data they need quickly from FabTime, and then spend their time making real improvements."
Mike Hillis
Cycle Time and Line Yield Improvement Manager
Spansion Fab 25

FabTime Subscription

One low monthly price includes

- Software installation and real-time connect to your MES
- End user and system administrator training
- Unlimited users via your Intranet.
- Software maintenance and regular upgrades (via our no-downtime patch system)
- Add-on dispatching and capacity planning modules for an additional monthly fee

Interested?

Contact FabTime for technical details and/or a web-based demonstration.

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Turn fab MES data into information and save time and money

- Are your supervisors swamped with daily reports, but lacking real-time information?
- Is it difficult to link equipment performance to cycle time?
- Does each new cycle time analysis require IT resources?

FabTime can help. FabTime saves your management team time daily by turning fab 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. With FabTime, the end user can filter for exactly what he or she needs, while staying in a comprehensive framework of pre-defined charts. Most importantly, FabTime can help your company to increase revenue by reducing cycle times up to 20%.

"I use FabTime every day, and so do the supervisors who report to me. The data that I need is right on my home page where I need it when I come in every morning."
Jim Wright
Production Manager
Headway Technologies

FabTime Benefits

- Cut cycle times by up to by 20%.
- Focus improvement efforts on the tools that inflate cycle time.
- Improve supervisor productivity – cut reporting time by 50%.
- Improve IT productivity – eliminate need for custom reports.