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FabTime Newsletter

Volume 25, No. 3 **May 2024**

Information

Publisher: Recently acquired by INFICON, FabTime has been helping fabs with cycle time and performance improvement since 1999. FabTime's flexible reporting software, cycle time management course, and this newsletter are now part of the INFICON Intelligent Manufacturing Systems (IMS) group.

Editor: Jennifer Robinson, Cycle Time Evangelist for INFICON

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Contributors: Hani Ofeck (Tower Semiconductor); Suhaib Karari (FormFactor); Paul Campbell; Thomas Beeg (Fabmatics)

Keywords: Fab Management; Metrics and Goals; AI/ML; Benchmarking; Value Stream Mapping

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Welcome

Welcome to Volume 25, Number 3 of the FabTime Cycle Time Management Newsletter. In this issue we have announcements about an FOA Webinar that I'll be presenting on cycle time and about the FabTime team's first INFICON in-person User Group Meeting. There's also a head's up about an upcoming need to re-subscribe the newsletter, together with my usual highlights from industry news on LinkedIn. Our software tip of the month is about using FabTime to drill down into root causes, with a detailed example from our demo server.

There's a plethora of subscriber discussion in this issue, about standby-WIP-waiting time, value stream mapping (which two different people brought up), software for predicting outs, WIP Turns rates, and test wafer ratios. In our main article, we revisit the topic of what makes an effective daily fab status meeting, ranging from general thoughts on meeting purpose and structure to specific ideas about content that should be included. As always, we welcome your feedback.

Thanks for reading! – Jennifer

Community News/Announcements

Re-Subscribing to the FabTime Newsletter

We will be migrating this newsletter over to the INFICON mailing system later this year. This is an early warning that if you would like to continue receiving the newsletter after that, you will need to re-subscribe on the INFICON website. In the next issue, we'll include the link to re-subscribe. We are sorry for any inconvenience but want to ensure that we follow all necessary guidelines for protecting your personal data. Stay tuned!

FOA Star Webinar on Fab Cycle Time: Registration Link Now Available

Jennifer will be presenting a live webinar for SEMI, on behalf of INFICON. The topic, familiar to readers of this newsletter, is maximizing your manufacturing efficiency by gaining insight into the three fundamental drivers of fab cycle time. Details are included below. Registration is free but is required by SEMI. Register here!

Mark Your Calendars: FOA Fab Star Webinar: June 26, 8:00-9:00 am PT

Jennifer will be presenting as part of this new FOA webinar series.

- Topic: Maximize Your Manufacturing Efficiency: Gain Insight into the Three Fundamental Drivers of Fab Cycle Time.
- The session will discuss how improving utilization, variability and number of qualified tools leads to increased fab profitability. Examples will include:
  - Increasing fab capacity by reducing forced idle time on key tools due to lack of operators;
  - Reducing fab cycle time by showing the impact of hot lots on regular lot cycle time;
- Live polling will add interactivity.
- Register here: https://discover.semi.org/foa-webinar-maximize-your-manufacturing-efficiency-inficon-registration.html

INFICON 3

IMS 2024 User Group Meeting

INFICON is excited to announce the IMS User Group Meeting/Smart Manufacturing Symposium, October 15 – 17 in Austin, Texas. The event will have multiple sessions for FabGuard®, FPS, and FabTime® over the course of three days.

This will be the FabTime team's first time participating in this event, and we hope that many of our customers will attend. Hosting in-person user group meetings was a bit beyond our

capabilities as a standalone small business. While we've enjoyed our monthly Teams-based User Group meetings, we look forward to talking with our customers in person at this event. Plan for lively discussions and collaboration on a variety of topics, including:

- Technology Roadmaps
- In Depth End User Presentations
- Sensor Applications and Technologies
- AI/ML and Smart Manufacturing
- Subfab and Facilities Management and Control
- New Capabilities

Customers of FabTime, FPS, and/or FabGuard products are welcome and encouraged to attend. Please contact Mike Neel for more information.

Fab Owners Alliance Meeting: Women in FOA Forum

Jennifer will be speaking on May 15th at the first-ever Women in FOA Brunch and Discussion at InnovaFlex Foundry in Colorado Springs, CO. Her topic, inspired by the existence of this new session, is **Change**. She'll also be attending the Wednesday Welcome Reception and Thursday General Meeting, as will John Behnke from INFICON, and hopes to see you there.

Highlights from Jennifer's LinkedIn

Jennifer continues to share articles about business management, the semiconductor industry, and productivity improvement on her LinkedIn feed. Recent links have included:

- An interesting story from the WSJ about Nanotronics, which is producing the "'Cubefab,' a modular chip manufacturing facility bundled with artificial intelligence-powered software that can be shipped anywhere and assembled on-site. A Cubefab can be up and running within a year, producing semiconductors in virtually any location, the 14-year-old company said... While Nanotronics has yet to land an American customer, all design and scientific work happens at its headquarters in the Brooklyn Navy Yard." These fabs don't make advanced chips but are focused on switches. [LinkedIn Post.]
- A graph, included in a White House Council of Economic Advisers update, that shows that annual employment in semiconductor manufacturing, after falling off a cliff in the early 2000s, is rising. "The jobs created at these facilities (wafer fabs) have typically been high-quality and well-compensated. Median annual wages in the semiconductor and other electronic component manufacturing industry exceed those of both overall manufacturing and several other comparable sectors according to the Bureau of Labor Statistics (Figure 2). In particular, the median wage at these jobs is nearly double that of jobs in retail trade." [LinkedIn Post.]
- A WSJ report that SK Hynix plans to build an advanced packaging facility in West Lafayette, Indiana, investing $4B and creating 800-1000 new jobs. The company will receive state and federal tax incentives to help. "The SK Hynix factory would become the first major facility for large-scale HBM (high-bandwidth memory) packaging in the U.S., said Dylan Patel, chief analyst at SemiAnalysis, a chip-industry consulting firm." [LinkedIn Post.]

- A report that "Samsung Electronics plans to more than double its total semiconductor investment in Texas to roughly $44 billion, according to people familiar with the matter, a significant breakthrough in the U.S.'s quest to make more of the world's cutting-edge chips… The additions include a new chip-making factory, and a facility for advanced packaging and research and development." [LinkedIn Post.]
- An opinion piece by Chris Miller in the Financial Times (subscription required) that calls the Chips Act spending to date (about half of the promised total) "surprisingly successful... Chip companies and supply chain partners have announced investments (totaling) $327bn over the next 10 years, according to Semiconductor Industry Association calculations." Miller believes that this investment surge has given the US "much more scope to manage (geopolitical) shocks." Here's hoping! [LinkedIn Post.]
- A Semiconductor Digest piece profiling two women from the semiconductor industry honored for their contributions in the manufacturing arena. "Last week, the Manufacturing Institute (MI)—the workforce development and education affiliate of the National Association of Manufacturers—honored two outstanding women from GlobalFoundries (GF) at their annual Women MAKE Awards. Jenny Robbins, Senior Director, Central Facilities, was recognized as a 2024 Women MAKE Awards Honoree, while Katelyn Harrison, Senior Integration Engineer, was honored as an Emerging Leader."

For more industry news, connect with Jennifer on LinkedIn.

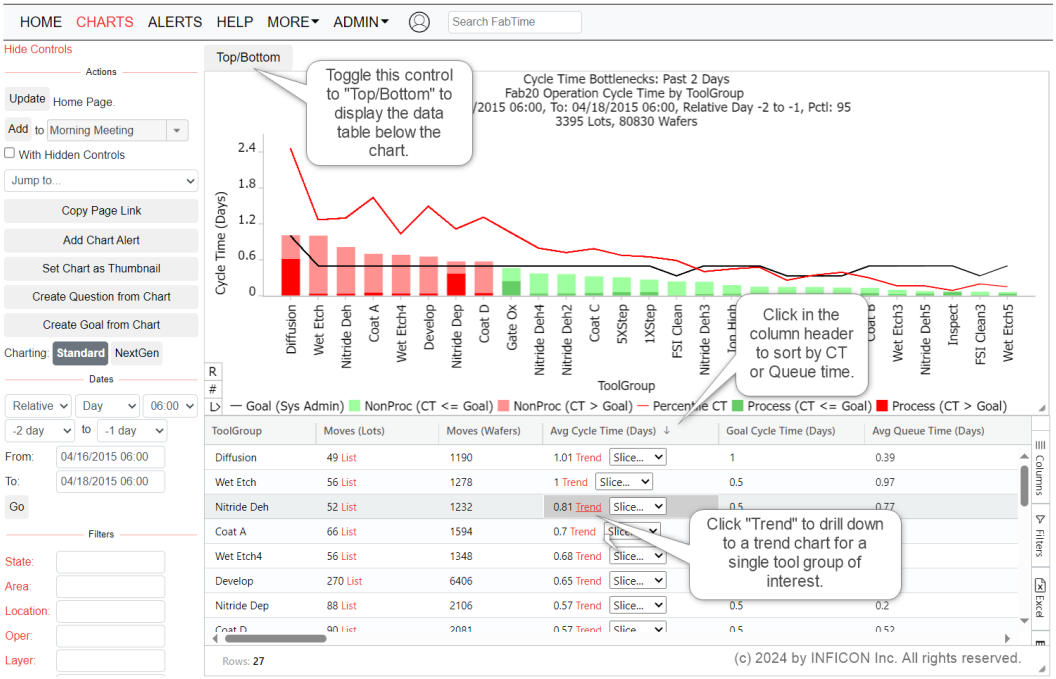
We welcome the opportunity to publish community announcements, including calls for papers. Send them to Jennifer.Robinson@inficon.com.

FabTime® Software Tip of the Month

Use FabTime to Drill Down into Root Causes of Cycle Time

An important way that people use FabTime is to see a high-level problem and then drill down to understand root causes. Here's an example from our demo server of how this can work.

1. Generate an Operation Cycle Time Pareto chart. Edit the chart dates to be a recent window (the prior two days in our example below) and choose "ToolGroup" from the "Slice" drop-down. The resulting chart (shown at the top of the next page) shows the current cycle time bottleneck tool groups. Toggle the "Chart" button to the upper-left corner of the chart, if needed, to display the data table below the chart ("Top/Bottom").
2. Identify a problem tool group to analyze. In this example, the Nitride Deh tool group has a very small amount of process time (the dark red bar) and 0.77 days per visit of queue time (the light red bar). Click the red "Trend" link in the "Avg Cycle Time (Days)" column of the data table to drill down to a trend chart showing just the Nitride Deh tool group. On the resulting Operation Cycle Time trend chart (which by default will show a week of history by day), change the period length ("Len:") to 12 hours for more granularity. In this example, the Nitride Deh tool group had very low cycle time early in the week, but the cycle time started rising on April 15th, and then stayed high.
3. The next step is to explore possible causes for the cycle time increase starting on April 15th. Click on the "Jump to…" drop-down to the left of the chart and select "Arrivals Trend" to switch to a chart showing arrivals by shift to the Nitride Deh group over the same period.



4. The resulting Arrivals Trend chart shows that the Nitride Deh tool group was starved early in the week. On the April 14th night shift, right before the cycle time started increasing, there were twice as many arrivals as usual. Two days later, before the cycle time could go back down, another high-arrival shift occurred.

5. Jump again to the Tool State Trend chart to see whether equipment availability also had an impact on the rising cycle times. The Tool State Trend chart shows that during the same shift in which the tool group received double the normal arrivals, 40% of total time across the two tools in the group was spent in engineering time. Either click on the April 14 18:00 bar of the chart, or select “Tool” from the “Slice by” column in the data table for the associated row. Either option will drill down to the tool state data by tool for that shift.

6. What the tool state data by shift reveals is that one of the two tools in the Nitride Deh group spent nearly all of the shift in engineering time. This reduced capacity of the tool, combined with the variable rate of arrivals, led to a WIP bubble, exacerbated by additional arrival variability and engineering time later in the week.

7. Click again on the Tool State Trend bar for either tool to drill down to the Tool State Transaction List chart for more details. Were there comments about why the engineers needed the tool at exactly the wrong time, in terms of arrivals?

You can use the “Jump to…” and drill-down links to start from any top-level FabTime chart and drill into root causes. On the tool side, you can go all the way down to individual transactions logged on each tool. On the WIP side, you can drill down to histories of individual lots showing every transaction recorded, or to lists of individual move-related transactions recorded by any set of tools.

We hope you find this tip useful in driving improvement efforts in your fab.

FabTime software module customers can subscribe to the separate Software Tip of the Month e-mail list (with additional chart images and other details for customers only) by sending your request to Jennifer.Robinson@inficon.com. Thanks!

Subscriber Discussion Forum

Standby-WIP-Waiting Time in Manual 200mm Fab

A longtime subscriber wrote in response **to Jose Garcia's** question last month about how much time bottleneck tools in a 200mm fab with manual lot transfer spend idle with WIP available (what's reported as Standby-WIP-Waiting in FabTime) might be reduced by adding automated material handling. The subscriber wrote: "A couple of thoughts from another perspective on this:

1. If a toolset is really the bottleneck and running at maximum OEE, it should never be starved of WIP, i.e., there is always WIP waiting by definition. If WIP wasn't waiting, it wouldn't be a bottleneck, or the line balance would be highly non-optimal. So having even more WIP arriving faster doesn't help improve the output of the toolset. Unless the fab logistics are so unusual that bottleneck tools actually do run dry of WIP. In my opinion, an AMHS system would not help here. Other factors would need to be solved first. Never let your bottleneck be allowed to sit idle, no matter what the reason. Use pit crew PM, overstaffing, covered lunches, etc. etc. Those things are the basics before any help is needed from an AMHS.
2. Clearly for a non-bottleneck tool group, faster WIP arrival will certainly help cycle time. It all depends on the logistics of the current human delivery methodology and local WIP-rack stocking of the lots."

Response: Regarding this feedback, we of course agree with the second comment. For the first, we think that the reason that bottleneck tools might have standby WIP waiting time isn't that they are starved. It's that they sometimes sit idle with WIP in front of them because there is no one there to load the tool. But if that's the case, then changes to the AMHS system wouldn't help that, would they? Unless by adding AMHS you free up the operators to be in the right place to load the tool, and thus reduce the standby WIP waiting time. We do agree 100% that situations where the bottleneck is running dry of WIP are problematic. It seems to us that adding an AMHS could even make that situation worse if the reliability of the handling system was in question. None of this directly addresses Jose's question about the percentage of time that tools spend in a standby-WIP-waiting state. But it's a good reminder to think about what the root causes are for inefficiencies in the fab.

Benchmark Numbers on Turns Rate

An anonymous subscriber reached out to ask if we knew of any industry-standard targets for daily WIP Turns rate for a high volume fab.

Response: We have not historically collected benchmark data for turns and are sending out the question to the subscriber community. Is there a benchmark turns rate for a fab, or does it depend on the fab's cycle time target and product mix?

Photolithography Process Value Stream Mapping (VSM) Benchmarking

Hani Ofeck from Tower Semiconductor wrote: "Are you familiar with benchmarking for the photo lithography process Value Stream Mapping (VSM)? Specifically, I am looking for information on the percentage waiting time for the cell process, plus the process time itself, versus the percentage waiting time for measurement testing (alignment, DI inspection, etc.), plus measurement testing itself. I'm looking for something similar to the table below:

Photolithography Value Stream Mapping (VSM)		
		Time %
Waiting time for the cell process	VA(Value-Added)%	
Cell process		
Waiting time for measurement testing (alignment, DI inspection, etc.)	NVA(Non-Value Added)%	
Measurement testing time		
		100%

I would appreciate any guidance or advice you can provide based on your experience."

Response: We're not familiar with Value Stream Mapping for photo and are passing on this question to our subscribers. Does anyone have any input that that they would be willing to share with Hani?

Real Time Example of a Value Stream Map for a Wafer Fab

Coincidentally, another subscriber also asked about Value Stream Mapping, though in a more general context. **Suhaib Karari from FormFactor** wrote: "Do you have a real time example of a Value Stream Map for the Wafer FAB. I am trying to create one, but there is not enough data I can find."

Response: This is another request for which we didn't have anything to share. Do any other subscribers know of a publicly available source for a VSM for a wafer fab?

Test Wafer Ratios

Last month we shared a question from a subscriber looking for ratios of test wafers in wafer fabs. After publication, **Thomas Beeg** posted some survey results on this question at his Factory Physics and Automation blog. Thank you to any subscriber who contributed to the survey! For anyone interested in test wafers, this post is worth a look.

Software for Planning/Predicting Fab Output

I (Jennifer) had a discussion recently with longtime FabTime friend Paul Campbell. Paul was looking for commercial software to better plan/predict output from the fab. FabTime can predict which lots are going to ship based on the planned cycle time for future operations, but it's not simulation based, and accuracy depends on how good those planned cycle times are. The INFICON FPS Scheduler can help optimize output, but doesn't directly predict shipments beyond the current scheduling window. The INFICON WIP Flush system is a calculator that predicts factory outs, broken down by future weeks. It lets you see when all WIP could be expected to leave the factory based on different dynamic cycle time windows, or history, or a FIFO queueing model, or assuming nothing ever goes on hold, etc. But it also does not use simulation.

I think that many fabs are using custom systems that they've pieced together, often based on Excel spreadsheets. So, I'm passing on this question to the subscribers. What software do you use to help plan/predict output? Is it based on simulation? Scheduling? Queueing models? What do you think is the most effective method for output planning for a wafer fab?

We welcome the opportunity to publish subscriber discussion questions and responses. Simply send your contributions to Jennifer.Robinson@inficon.com.

What Makes an Effective Daily Fab Status Meeting?

Introduction

Hani Ofeck from Tower Semiconductor reached out recently to ask if we had any thoughts or advice on the content that should be covered in daily fab status meetings. We (Frank Chance and Jennifer Robinson) had written a newsletter article back in 2007 on "What Makes an Effective Morning Meeting?" On review, we found much of the content of that article still relevant. However, we found the earlier article to be lacking in detail on what specific content morning meetings should cover. In this article, we've taken the framework from that earlier article and fleshed it out on the content side, with additional help from Hani.

Nearly all fabs we know hold a daily fab status meeting. Usually less than an hour long, this meeting is the daily get-together for the fab manager and production, equipment, and process managers. With so many people in the room, it's an expensive meeting. For that reason alone, it's worth our attention. However, the salary expenses are likely dwarfed by the opportunity cost of what these attendees could accomplish were they to have an uninterrupted hour of time at their primary job (which is **not** attending meetings!). In this article, we explore the question of "what makes an effective daily fab status meeting?"

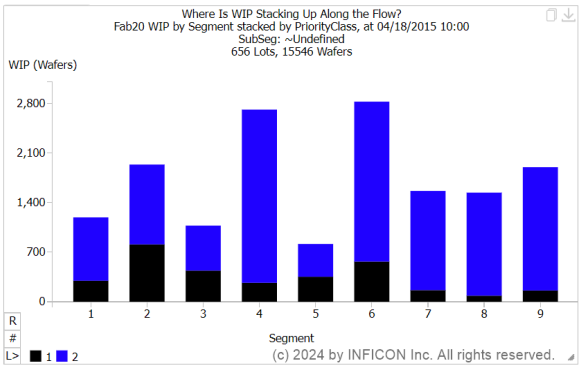
We choose the adjective "effective" (rather than "good" or "useful"), a la Peter Drucker, meaning "to get the right things done." Thus, we ask, what are the right things that must be accomplished by a daily fab status meeting... in short, what is the purpose of this meeting? Some possibilities include:

1) To distribute relevant information.
2) To hold individuals responsible for meeting goals.
3) To make necessary decisions.
4) To brainstorm solutions to an important problem.

1) To distribute relevant information (the "State of the Union" for the fab)

In the daily status meetings we have attended, this function often takes most of the allotted time. Examples include:

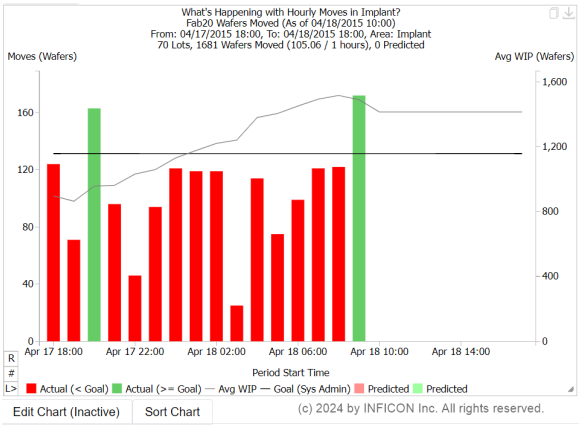
- Review down tools, report the reason for the current delay (waiting for parts, waiting for qual, etc.), impact on production, and estimated uptime.
- Review WIP location across the line (by priority or product family).



- Review constraint performance for the prior day and week-to-date.
- Review progress toward daily and weekly goals.
- Review each rocket lot, report its current location, holdups yesterday, and expected travels today.
- Review moves / turns / scrap / shipments performance for the prior day and week-to-date.

2) To hold individuals responsible for meeting goals

As part of the review of progress against goals, we have often seen individuals put on the spot at fab status meetings if the performance for their area is falling behind (as shown with the Implant moves in the image to the right, with poor performance relative to goal over recent hours). Depending on company culture, these encounters can range from a friendly jousting to an emotionally charged confrontation.



3) To make necessary decisions

Occasionally, we have seen morning meetings that cover decisions such as:

- Elevating the priority of a particular lot due to a request by its owner.
- Prioritizing limited equipment engineering resources against down tools, improvement projects, etc. Equipment personnel know what is happening with down tools, equipment install, etc. Production personnel know the relative pain of work that cannot be processed due to equipment problems. Between the two sides an agreement must be reached on priorities.
- Scheduling requests by CIM or IT for support system downtime.

4) To brainstorm solutions to an important problem

To a very limited extent, we have seen brainstorming at morning meetings. This has typically been a small portion of the agenda, and more often appears in an ad-hoc way in response to a report that is being given, e.g.:

- A constraint tool was starved for nearly an hour this morning. Why wasn't there sufficient WIP to keep it running? What needs to change to keep it busy in the future?
- Scrap was a problem yesterday at operation X. What happened and can we prevent it from happening again?
- WIP is piled up in the front end of the line, what can we do about that?

Brainstorming can also be used to encourage team members to highlight obstacles or challenges they have encountered during their shifts. Teams can use problem-solving techniques like the "5 Whys" to delve into root causes and develop effective solutions. In general, these types of brainstorming are likely done elsewhere, and the results are reported at the morning meeting.

How Should the Daily Fab Status Meeting Be Structured?

Suppose the time allocation at a typical fab status meeting is:

- 70% to distribute information.
- 20% to hold individuals accountable.
- 5% to make decisions.
- 5% to brainstorm solutions.

Is this the right mixture? Are these the right things to do each morning? Is there a way to prune topics that are not required, to leave time for those items that are important and can only be accomplished in a meeting of production, equipment, and process personnel? These are important questions, and we do not have ready answers, but our suggestion is to return regularly, say once a quarter, to first principles and ask:

- What is the purpose of our fab status meeting? Is our meeting agenda structured to achieve this purpose?
- Is each topic or report on the agenda still relevant, or was it added in response to a special situation that no longer exists?
- How good are we at assigning responsibility for necessary actions that come from the morning meeting?
- How good are we at following up to confirm that assigned actions have been completed, or cancelled if no longer necessary?
- Can we make our presentation of information more compact, so that we may cover more material in the same time, or the same material in less time?
- Is there communication that we can have outside of the fab status meeting, to reduce the time required for the meeting itself?
- Can we improve our productivity by decreasing the amount of preparation time required for the meeting?
- (These last three are areas in which software from INFICON can help.)

Visit Fab /Gemba Walk: As one more thought on meeting structure, Hani also suggests that fabs incorporate a Gemba walk into the meeting agenda from time to time. This involves physically observing the production floor to identify opportunities for improvement and address any issues in real-time.

Three rules, as stated by Toyota's former chairman Fujio Cho, are essential if we want the Gemba walk to be truly effective:

- Go **see**: We must go see with our own eyes how the fab operations and processes (production, etc.) align with the overall objectives of the company and its standards. We will see things from the fab floor that we can't see from an office or meeting room.
- Ask **why**: We must understand each step of the manufacturing process in detail to know how to eliminate day-to-day problems. Many tasks are done routinely without the staff wondering if they are right or wrong. Asking why will provide insight to improve processes.

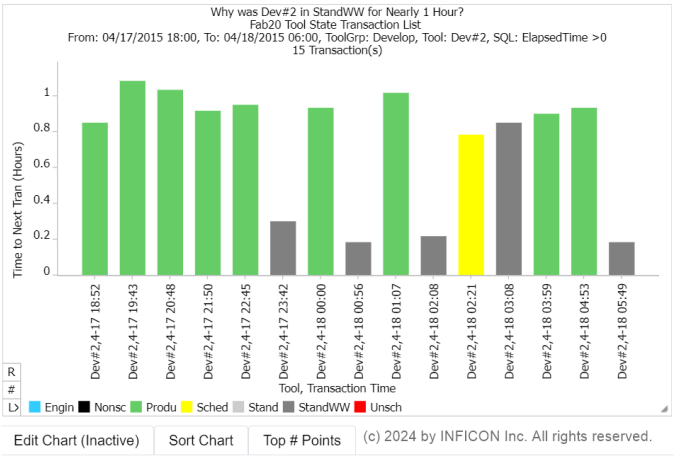
- Show **respect**: We should always show employees and workers that we care for their well-being. Involving employees and letting them know that Gemba walks are performed to make their life at work easier is essential.

What Content Is Most Important to Cover in the Meeting?

The preceding sections convey general thoughts about the structure of a daily fab status meeting. But what about the content? What's most important to look at? Three categories of content that we think are helpful to include here are current problems, KPIs, and predictions.

Problems: It seems to us that the most value-added thing to cover in the daily status meeting is the list of current problems or anomalies, particularly those where decisions or action are required. This might include:

- Bottleneck tools with a significant quantity of "standby-WIP-waiting" time and/or "post-processing time" in the past day. These tools may lack sufficient operators to avoid forced idle time.
- Tools that are currently down and have been down for some number of hours.
- Hot lots that are not in process (especially hand-carry lots).

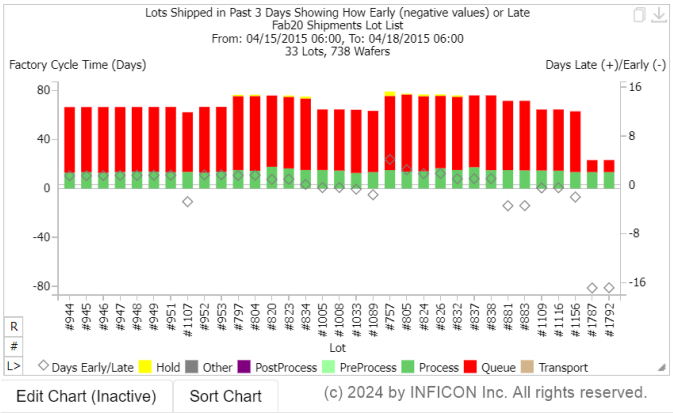


- Hot lots and/or lots for key customers that are behind schedule.
- Lots on hold for more than some period of time.
- Operations that have WIP waiting where there is only one qualified tool (unless that tool is a true one-of-a-kind tool).
- Tools that are cross-qualified but are registering fewer moves than expected. Often this is due to soft dedication (operator preferences).
- Lots that have reached a "future hold" step where the engineer is out of office.
- Tools where the hours of WIP waiting to be processed per tool are greater than shift length (these are short-term bottlenecks).
- Tools where the average x-factor per visit for lots moved recently is highest in the fab (these are cycle-time bottlenecks).

Of course, it's most useful to discuss these issues if each discussion concludes with a plan of specific action by specific people. Something that we're excited to be working on at INFICON is generating a list of these problems automatically, and ranking them by impact on fab performance, so that precious meeting time can be used to address the most pressing issues.

KPIs: It remains important to keep an eye on the fab's overall key performance indicators. A list that we've shared with customers previously (and to which Hani contributed) includes:

- On-Time Delivery and Cycle Time for shipped lots
- Starts
- Shipments
- Moves
- WIP (total and profile by segment of the line)
- WIP Turns (moves / average WIP)



- Scrap and Risk WIP
    - Risk lots are marked as not shippable but not scrapped yet.
- Priority Lots, Lots on Hold, and Idle or Static WIP (WIP that has been in queue for more than some threshold, e.g. 12 hours)
- OEE Outliers
    - Break down OEE into its components: Availability, Performance, and Quality, to identify areas for improvement in equipment efficiency.
- Current Capacity Bottlenecks by Tool Group and Area

These are core metrics that demonstrate the overall health of the fab. In all cases, these charts should be displayed visually relative to a goal, either an automated goal, or a chart stripe that indicates a goal region. Looking at the current data as well as the trend for the week gives a manufacturing team a quick idea of the fab's progress. Visual Management is essential for effective data communication and analysis. Using visual aids like dashboards, charts, and graphs enhances people's ability to process complex information.

Predictions: More fabs that we speak to these days also want to keep an eye on expected future performance. The idea here is to make sure that the outcomes predicted by current conditions are acceptable. If not, it's better to learn about any problems now, so that we can course-correct while there's still time. Some things to look at here include:

- Forecast outs: What WIP do we expect to ship this week? Will it be on schedule?
- Future cycle time: Based on current performance, what do we expect our cycle time to be in the future? A metric to use here is Dynamic Cycle Time, as discussed in Issue 24.03. Dynamic X-Factor can also be used, as discussed in Issue 9.04.
- Planned and predictive maintenance: What major scheduled maintenance do we know is going to take place in the next few days? Are there measures that should be taken to mitigate the impact of these events?

Fabs of the future will become better at using AI and machine learning to predict output, cycle times, process problems, and both scheduled and unscheduled downtime events. INFICON is currently working with customers to increase the use of AI in factory operations and process control. This includes Smart Scheduling and Machine Learning fault detection techniques.

Conclusions

The daily status meeting sets the tone for the fab. Our hypothesis is that fabs that hold effective daily status meetings are also likely to be effective at achieving their manufacturing goals. A morning meeting is effective if it routinely achieves its stated purpose, whether that is to distribute information, hold individuals accountable, make decisions, brainstorm solutions, or another purpose specified by fab management. We hope that this article has motivated you to examine the effectiveness of your daily production meetings.

Closing Questions for FabTime Subscribers

What is the primary purpose of your daily fab status meeting? When measured against this purpose, how effective are your meetings? Is anyone responsible for making these meetings more effective? What do you consider key content to include in these meetings?

Acknowledgements

Thank you to Hani Ofeck, who raised the question that led to this new article and took the time to review it and suggest additional content to include. Thanks also to Scott Mason, Mike Hillis, Martin Crawford, and Mike Lindstrom for discussions on this topic that contributed to the original article, and to Mike Neel for his contributions to this version.

Further Reading

Peter Drucker, The Effective Executive: The Definitive Guide to Getting the Right Things Done (revised edition), Harper Business, 2006.

J. Robinson and F. Chance, “Dynamic X-Factor and Shipped Lot X-Factor,” FabTime Newsletter, Vol. 9, No. 4, 2008 and “Forward-Looking Cycle Time Metrics,” FabTime Newsletter, Vol. 24. No. 3, 2023.

All past FabTime newsletters are available for download from the FabTime Newsletter Archive. The current password is FabTimeCommunity.

Subscriber List

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- Nanyang Technological University (3)

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