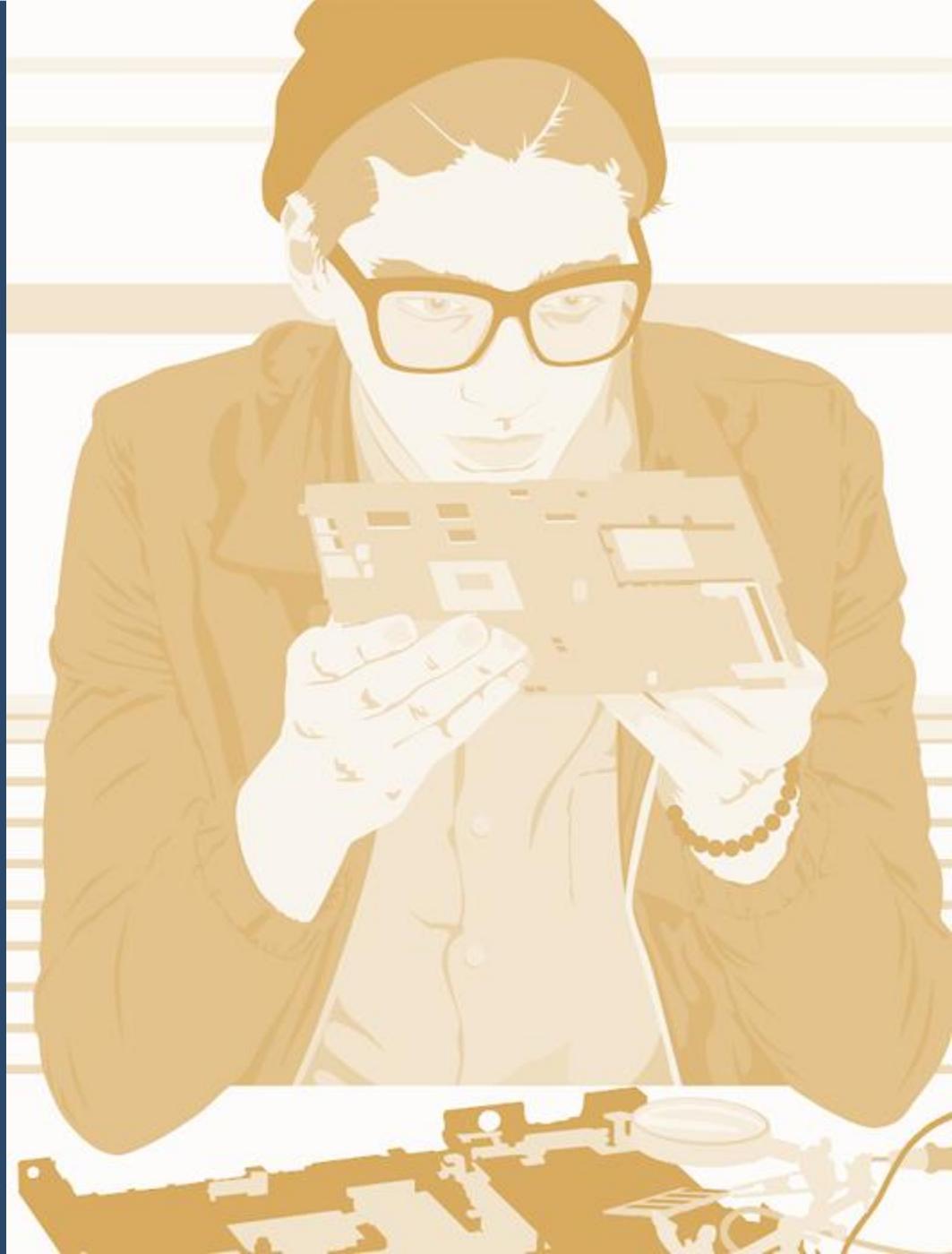


ACCELERATING BOARD SYSTEMS DEVELOPMENT WITH PERVASIVE SIMULATION

LIFECYCLE  INSIGHTS



THE POOR HEALTH OF BOARD DEVELOPMENT

Do electronic simulations pay off?

Answering that question is the purpose of Lifecycle Insights' *Electronics Simulation Driven Design* study. Conducted from March to September 2018, this research focused on providing quantifiable insight on the impact of early simulation on board systems development.

One of the first and most important issues this study examines is the current state of board systems development. The findings, shown to the right, paint a troublesome picture. Cancelling projects is a natural part of any healthy portfolio management process, but 17% is high. When projects lag, engineers must shift to work in emergency fashion. Despite those emergency efforts, fully 28% of projects miss their release dates. Sometimes, however, those endeavors are successful with 30% of projects hitting their release dates after such resource shifts. Overall, only 25% of projects go as planned, hitting design release without any resource surge.

Why is the health of board systems development so dire? More findings from the study reveal answers.



THE HIGH COST OF RESPINS

Anecdotally, many know that respins are a primary contributor to the poor health of board systems development. The effort to build and test multiple prototype board systems is costly in both time and money. Lifecycle Insights' *Electronics Simulation Driven Design* study has quantified that impact. On average, engineering organizations experience 2.8 respins per project.

From a schedule prospective, these additional respins are significant. Each respin consumes an additional 8.5 days in the schedule. Given that, the extra respins beyond one result in a delay of 16 days in the development schedule. It is easy to see why so many board systems are cancelled, miss design release, or require a resource surge to stay on time.

The cost implications of respins are equally troubling. The total cost to build and test another board prototype is \$46,000. The extra 1.8 respins total \$83,000 per project. Unlike the delays involved with respins, these costs *accumulate across projects*. For 10 such projects, the total is \$830,000. For 100 projects, the total is \$8.3 million. This consumes development budgets at a fast rate.

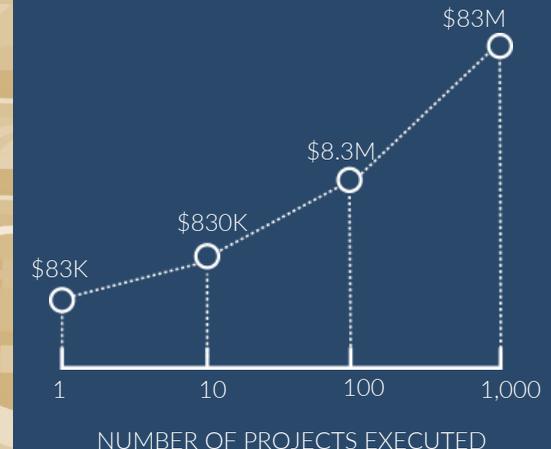
ORGANIZATIONS
AVERAGED 2.8
RESPINS PER
PROJECT



EXTRA 1.8
RESPINS RESULTS
IN 16 DAYS LOST
EACH PROJECT



\$83,000 EXTRA
COSTS INCURRED
FOR EACH
PROJECT
EXECUTED



DIFFERENT STRATEGIES FOR SIMULATION

One of the primary objectives of this study was to quantitatively determine if the use of simulation early and often, even pervasively, in the development of board systems positively affected these outcomes. As a result, it was important to isolate organizations that use simulation pervasively and those that do not.

To accomplish this task, Lifecycle Insights separated respondents based on three key questions that gauged simulation use in board systems development. Once grouped into such cohorts, it was important to understand just the difference in how frequently these organizations used simulation in these cases. The results show marked differentiation.

Those categorized into the *Pervasive Simulation Use* group apply simulation at a high rate in all three cases. Those falling into the *Moderate Simulation Use* cohort apply simulation roughly half time, trailing off towards the final check before testing. Those in the *Limited Simulation Use* group infrequently apply analysis, especially late. The pervasive application of simulation in board systems development should mitigate some of the issues related to respins and the resulting high rates of projects missing design release or requiring resource surges.

PERVASIVE
SIMULATION
USE

MODERATE
SIMULATION
USE

LIMITED
SIMULATION
USE



Electrical engineers use analyses to guide decisions



Electrical engineers use analyses to verify performance



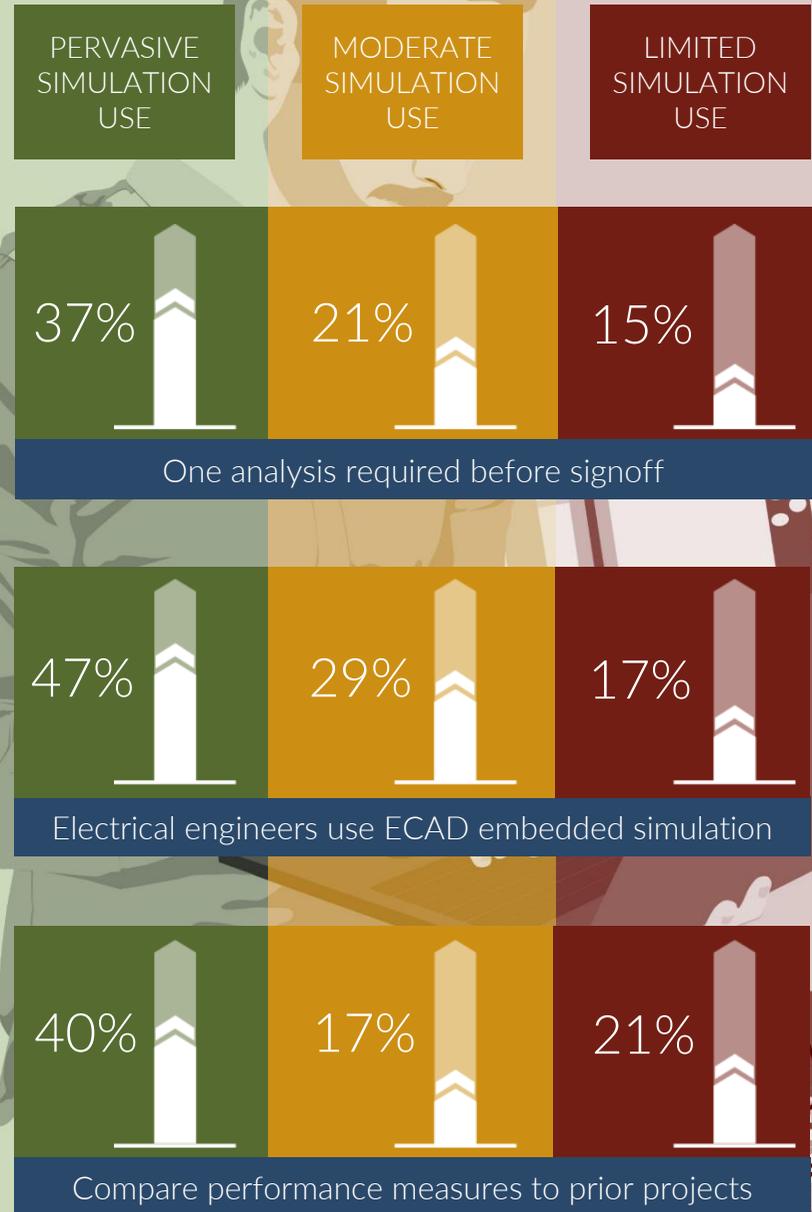
Expert analysts use simulations to prior to testing

DIFFERENT TACTICS FOR SIMULATION

To apply simulation often and throughout the board development process requires technology solutions. Electrical engineers need simulation tools that are easy to use and accessible. The *Pervasive Simulation Use* cohort leverages such tools in their development environment at nearly three times the rate of those in the *Limited Simulation Use* group (47% vs. 17%).

Note, however, that using simulation pervasively in development is more than just providing the right tools to the right roles. The *Pervasive Simulation Use* cohort also include a process check, requiring at least one analysis before design sign off, at over two times the rate as those in the *Limited Simulation Use* group (37% vs. 15%). This is key because many development projects are under extremely tight schedules. Prioritizing, and even *requiring*, at least one simulation before considering the design for sign off is one means to overcome cultural pushback to the benefit of the organization.

Lastly, the *Pervasive Simulation Use* cohort further differentiates itself by using past projects to gauge success. Leveraging a body of past knowledge, especially with analysis, allows the organization to make better decisions going forward.

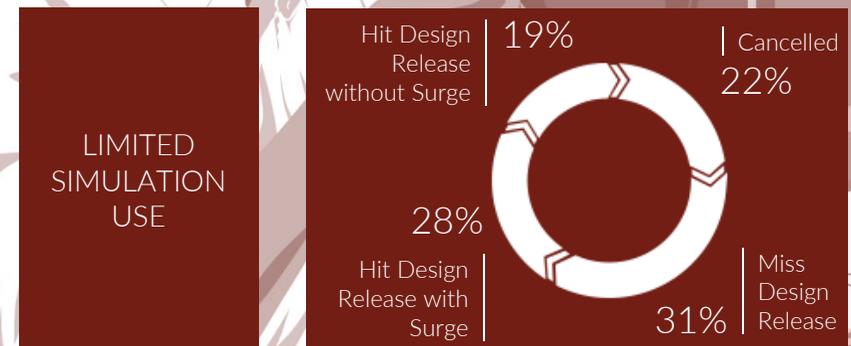
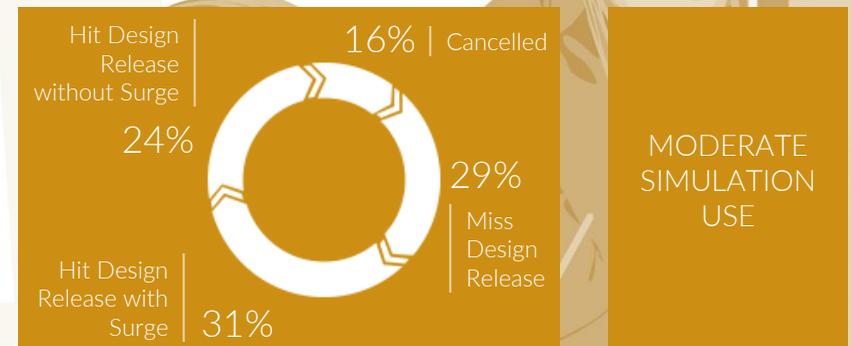
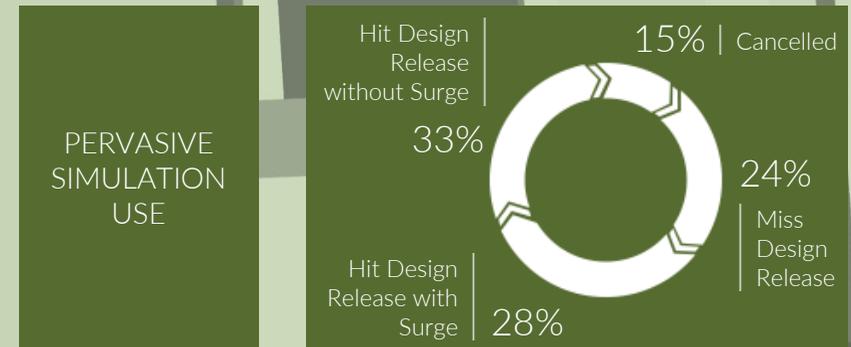


REALIZING VALUE FROM PERVASIVE SIMULATION

We find noticeable differences in how these groups apply simulation to development. However, does it have an impact on organizational performance? The answer is a notable yes. Overall, the companies that use simulation pervasively in development have a positive shift in project success rates. Comparing the *Pervasive Simulation Use* cohort to the *Limited Simulation Use* cohort, differences include:

- Reduction of one-third in the rate at which projects are cancelled (15% vs. 22%).
- Reduction of one-quarter in the rate at which projects miss design release (24% vs. 31%).
- Increase of one-half in the rate at which projects hit design release without a resource surge (33% vs. 19%).

The *Pervasive Simulation Use* group applies analysis often and throughout the board development process. As a result, they reap tangible benefits. They cancel projects at lower rates. They miss design release at lower rates. They hit design release, without resource surges, at higher rates.



RECOMMENDATIONS

There's no denying it: the health of board systems development is poor. However, the application of electronic simulation often and throughout the board development process promises benefits. Lifecycle Insights' *Electronic Simulation Driven Design* study quantifies many facets of such efforts, including:

- The *Pervasive Simulation Use* cohort applies simulation much more pervasively across three cases in board systems development than do their peers in the *Limited Simulation Use* group.
- The *Pervasive Simulation Use* cohort provides the right technologies to their electrical engineers to enable pervasive simulation. However, they also include process checks and comparisons to prior projects as well.
- The *Pervasive Simulation Use* cohort hit design release without a resource surge at a fifty percent higher rate than do the *Limited Simulation Use* group.

As a result, Lifecycle Insights recommends:

- Investigate analysis tools for electrical engineers.
- Consider simulation requirements for processes.
- Compare current and prior project metrics.



Chad Jackson is the chief analyst and content director at Lifecycle Insights, providing insights on a range of technology-led initiatives across mechanical, electrical, embedded software, system, and IoT engineering.

Lifecycle Insights is a research and advisory publishing firm. Our mission is to empower executive's ability to reap more value from technology-led engineering initiatives in less time, with more surety, and less disruption.

The entire contents of this publication are copyrighted by Lifecycle Insights and may not be distributed, reproduced, archived, or transmitted in any way, shape or form without prior written consent by Lifecycle Insights.

CONTACT

EMAIL contact@lifecycleanights.com

SITE www.lifecycleanights.com