

DfR Solutions

reliability designed, reliability delivered

DfR Solutions Newsletter March/April 2009

[Cheryl Tulkoff Joins DfR Solutions!](#)

Business is Blooming

It is spring and DfR Solutions has recently been awarded a number of significant research contracts in the field of electronics reliability. They include:

- [Predicting Pb-free Reliability under Vibration and Shock](#)
- [Assessing the Quality of Reballled Parts](#)
- [Developing a Software Solution for Integrated Circuit Wearout](#)

For each of these projects, DfR is actively looking for industry and academic partners that wish to leverage existing funding. If you are interested, please contact [Bob Esser](#) or [Nathan Blattau](#).

[DfR Opens Office in Texas](#)

We believe it is somewhere in Central Texas (or was that East Texas?)

Predicting Failure of Integrated Circuits

Manufacturers of next generation integrated circuits are struggling to balance improved performance with higher failure rates and shorter lifetimes. In response to this critical issue, DfR is developing a software solution that will provide engineers better insight into this critical reliability issue. One aspect of our solution will use a [multiple mechanism technique](#) developed by [Professor Joey Bernstein](#) of Bar-Ilan University. If you would like more information or a presentation to your technical team, please contact [Ed Wyrwas](#) or [Bob Esser](#).

Did you know that the DfR Newsletter was a [widely read industry email forum](#)?

Industry Buzz: 0.3mm Pitch is Coming!

A number of [mobile device manufacturers](#) are starting to implement the latest reduction in package feature size. And, as always, DfR is out in front of this industry trend. Read this [white paper](#) on some of the changes and challenges of 0.3mm pitch.

Success of the Month: Circuit Catastrophes and Resolution

While most of our case studies can be described in one paragraph, [our successes in circuit analysis and resolution](#) fill almost an entire book! Some of the top issues we typically identify when performing circuit analysis and review include:

- Excessive ripple current on aluminum capacitors
- Missing decoupling capacitors or capacitors too far from the IC

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- Tying together inputs of unused op-amps and comparators
- Insufficient filtering of analog signals resulting in sensitivity to EMI

If you would like more information on how our electrical design review services can save you time and money, please contact [Ed Dodd](#) or [Ron Wunderlich](#).

Avoiding Design Failures

While ensuring reliable electronics is tougher than ever, DfR Solutions is taking design for reliability (DfR) to a new level. In this audio file, [Craig Hillman](#) discusses common design failures and ways to avoid them, as well as the increasing importance of physics of failure in design practices. [Click here to listen](#).

RoHS Updates Continue

The Öko-Institut and Fraunhofer IZM recently released [a report](#) on existing RoHS exemptions and five new requests for exemptions. The long and short of it is that none of the old exemptions that are recommended for removal or new exemptions are relevant for PCBA design or manufacturing. It is important to note that these are recommendations and the European Commission has no timeline for modifying RoHS based on these findings. For more information on environmental legislation, please contact [Craig Hillman](#).

Is Moisture Sensitivity Level (MSL) Enough?

While current industry standards J-STD-020 and J-STD-033 have been useful for documenting MSL in older component packages, there is an increasing indication that in today's thinner packages, moisture absorption can drive [excessive warpage during reflow](#). The resulting solder separation and [head-in-pillow](#) are extremely problematic, but do not induce classic popcorn failures. Do you think MSL should also be defined by maximum warpage? [Let us know](#). If you require any assistance with manufacturability or soldering operations, please contact [Cheryl Tulkoff](#) or [Jim McLeish](#).

IPC Wakes Up

While some people within the industry believe IPC fell asleep at the wheel for RoHS, this is obviously not the case recently. IPC [worked to exempt electronics](#) from California's most recent lead (Pb) legislation and has now announced that it is [actively supporting](#) the United States Trade Representative (USTR) in their challenge of the [REACH legislation](#) in the World Trade Organization (WTO). Now, on the flip side, those IPC members who actually believe REACH is a better piece of legislation than RoHS might be somewhat dismayed. What's a standards body to do? For more information on environmental legislation, please contact [Craig Hillman](#).

Opto-Electronics: The Secret to Success

Qualification of opto-electronic devices can be problematic given their lower manufacturing maturity and more stringent reliability requirements. This will become increasingly challenging as more optics are incorporated into electronics while OEMs and component manufacturers reduce staff to control costs. This [white paper](#) provides a first pass review of the activities necessary to ensure success in the selection of devices, the supplier, and eventual field performance. For more information, please contact [John McNulty](#).

Move Back to SnBi?

The electronics industry remains in turmoil as a slew of 2nd generation solders propagates throughout the supply chain. From SAC405 to SAC387 to SAC305 to SAC105 to SAC125Ni (Whaaa?). As confusion continues to grow, there is a growing interest in taking a second look at SnBi based alloys. Why? With Pb pretty much absent from electronics, SnBi alloys can allow a lower melting point, to 200C or below, without the [risk of the ultra-low SnPbBi](#) alloy everyone feared. For more information, please contact [Randy Schueller](#).

Questionable Science

An interesting article was published in this month's [Global SMT & Packaging magazine](#). The authors claimed that two

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identical packages in two different locations on a PCBA had very different times to failure under thermal cycling. Fascinating observation, but reader beware. The authors freely substituted fracture for fatigue (different mechanisms), claimed that thinner boards produced higher stresses (solder joint life can be 3X longer on thinner boards), and made an attempt to capture this behavior with board-level strain gauges that fell short of diligent analysis. For information on solder joint fatigue, please contact [John McNulty](#) or [Nathan Blattau](#).

DfR News

DfR Welcomes Cheryl Tulkoff as New Senior Member of Technical Staff

DfR Solutions is proud to announce the hiring of [Cheryl Tulkoff](#), an industry renowned expert in the fields of semiconductor fabrication, electronics assembly, RoHS conversion, and reliability engineering and management. Prior to joining DfR, Ms. Tulkoff took an active leadership role both within her employer's companies and among regional and national electronics and reliability organizations. At her most recent position at National Instruments, Cheryl developed a comprehensive reliability organization, including the creation of an internal failure analysis group and a closed loop reliability program. She has taken the lead in process development and implementation in semiconductor fabrication through her work at Cypress Semiconductor and in electronics assembly through her work at IBM. Cheryl is an ASQ Certified Reliability Engineer and has a BS in Mechanical Engineering from Georgia Institute of Technology.

DfR Solutions Opens Texas Office in Austin

In response to increasing demand for our services in Texas and among consumer electronic OEMs and semiconductor manufacturers, DfR has opened a Texas office. Located in Austin, this office will allow for closer interaction with our customers. The office will be headed by [Cheryl Tulkoff](#), who has extensive experience in semiconductor fabrication, electronics assembly, RoHS conversion, and reliability engineering and management. For more information or to schedule an onsite visit to your facility, please contact her by [email](#) or phone.

Upcoming Events

DfR in Upstate NY (**March 11-13**)

DfR Solutions will be visiting companies in Upstate NY (Buffalo, Rochester, Syracuse, Binghamton, Albany) in mid March. If you and your associates are interested in an onsite visit and/or presentation, please contact [Tammy Smittenaar](#) or [Joe DePeter](#).

IPC APEX Expo (**Las Vegas, NV: March 31-April 2**)

DfR Solutions will present several seminars at IPC APEX. They include "The Reality of Pb-free Reliability," "Design for Reliability: A Physics of Failure Based Approach," and "Next Generation Technologies in Electronic Packaging and Production." If you are interested in attending these courses, please contact [Tammy Smittenaar](#).

Wayne Tustin at DfR Solutions (**College Park, MD: April 1-3**)

Wayne Tustin will teach his popular short course "Random Vibration and Shock Testing, ESS, HALT & HASS" at DfR Solutions, College Park, MD. For more details and reservations, please [click here](#).

HALT Open House, co-hosted by the Qualmark Corporation (**DfR Solutions, College Park, MD: April 15**)

DfR Solutions, in conjunction with the Qualmark Corporation, is hosting a [HALT Open House](#) which is being held on April 15 from 11AM to 2PM at the DfR Solutions headquarters in College Park, MD. To read more about our HALT services, please [click here](#). To register for this event and find out about the latest and greatest in HALT technology, please contact [Carrie Sharik](#).

DfR in Western North Carolina / Western South Carolina (**mid-April**)

[Dr. Bob Esser](#) will be speaking to a number of companies in the Carolinas on a variety of topics, including test plan development, integrated circuit (IC) wearout, and Pb-free under vibration and mechanical shock. If you and your associates are interested in an onsite visit, please contact [Carrie Sharik](#) or [Ted Kress](#).

NEPCON East (**Boston, MA: April 22-23**)

DfR Solutions will present two courses, "The Reality of Pb-free Reliability" and "Next Generation Technologies in Electronic Packaging," at NEPCON East. If you are interested in attending these courses, please contact [Melissa Serres Marx](#) or [Tammy Smittenaar](#).

Development of 'Manhattan Project' for Pb-free Electronics (**Philadelphia, PA: April 22 – May 1**)
DfR Solutions has been invited to contribute to a critical meeting on the future challenges and solutions for Pb-free in military and aerospace electronics. The unique environments, life expectations, and extreme reliability requirements experienced by these products have not been completely addressed by existing research among industry and academia. At this meeting, in collaboration with other experts, DfR will help determine the best path forward. For more information, please contact [Craig Hillman](#).

DfR in Central Florida (**Early May**)

DfR Solutions will be visiting companies in Central Florida (Orlando, Kissimmee, Tampa) in early May. If you and your associates are interested in an onsite visit and/or presentation, please contact [Tammy Smittenaar](#) or [Joe Cormier](#).

SMQ Laboratories (**Shenzhen, China: early May**)

DfR Solutions and [SMQ Laboratories](#) will co-host a one-day seminar on Root-Cause Analysis (RCA) in Electrical and Electronic Products. This insightful training will provide a strong overview of this critical technique for continuous improvement and Six Sigma and some key case studies. For more details and reservations, please contact [John McNulty](#).

MicroTCA Summit (**Chantilly, VA: May 12-14**)

DfR and Washington Labs will present a half-day tutorial, "Getting Your Hardware Design Right...The First Time!" at the MicroTCA Summit. If you are interested in attending these courses, please contact [Lance Leventhal](#) or [Tammy Smittenaar](#).

SMTA Upper Midwest Expo and Tech Forum (**Bloomington, MN: June 11**)

DfR Solutions will give a presentation on "Second Generation Lead-Free Alloys" at the upcoming SMTA Vendor Day Meeting. For more information, please contact [Randy Schueller](#).

Philips Symposium on Advanced Reliability Engineering (**Eindhoven, The Netherlands: September 29-30**)

DfR Solutions has been invited to contribute to this European meeting on the latest techniques, trends, and challenges in advanced reliability engineering. For more information, please contact [Jim McLeish](#).

Design for Excellence Course (DfX) (**late October**)

This course will include all the elements for a successful design, including design for manufacturability, design for testability, design for reliability, and design for environment. Presented in collaboration with [Lou Ungar](#) of BestTest. For more information, please contact [Carrie Sharik](#).

Employment

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