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Check out our website at:

<https://my.asq.org/communities/home/182>



Editor's NOTE

Trevor Cranney
Chair, ASQ Reliability & Risk Division

Chair's Message

Welcome to 2021. Will it be better than 2020? I don't know, but I am hoping so like the rest of you and it is looking so thus far. Planning for this year continues to be difficult with travel restrictions and limited engagement. We all continue to do our best virtually while awaiting the opportunity to interact in person again. Our team is doing an excellent job in continuing to bring learning and development opportunities to you. Here is a synopsis for three of our primary activities:

RAMS 2021 to take place in Orlando, FL was delayed

from January to May this year. The RAMS Board of Directors had been meeting virtually and regularly in the months leading up to the scheduled conference in January. It is complicated to say the least in saying that it is difficult to agree to changes with 8 co-sponsors and a hotel contract that does not yield requirements, not even in a pandemic. RAMS 2022 planning is also underway, with the call for abstracts already released. So, please do not get confused. RAMS 2021 will occur in May and RAMS 2022 will occur as normally planned in January next year in Tucson, AZ.

Our webinar program continues to have high attendance and high visibility. Our most common question received is how to get recertification units (RU's) for attending and watching our webinars. When you register and attend a live webinar, an email is automatically sent to you 24 hours after the conclusion of the webinar. And now, for our recorded webinars, you'll be able to access them from our website (www.asqrrd.org) and receive an email granting RU's by filling out your name and email in the pop-up window at the conclusion of the playback. This has been an exceptional undertaking. This year we will be adding recorded webinars for this and organizing them on our website so that you can relate them to specific learning topics or BoK areas of the CRE. So, it is functional, but it currently has limited webinars available. The rest will be added.

Finally, our smaller RMMR conference was again cancelled this year. It is planned to return in Q3, 2022. We're not giving any further guidance on this event as we are waiting to see where the world stands with respect to the pandemic later this year. Here are a couple highlights from our annual report of 2020.

Update continued on page 2...

ASQRRD Plans for 2021

- Our division membership increased by 82.4%! An increase was not a surprise following ASQ changing division membership to open access a couple years ago. The size of the increase, however, was a clear sign of the activity and value being generated by our division and the increase in trust of our current elected leadership to focus on these activities.
- Both our revenue and expenses were much lower than planned for 2020 – no surprise there. We spent about \$700 over what we took in as revenue. This was primarily due to some early expenses associated with RMMR prior to it being cancelled. Otherwise, we were on par with planned expectations.

We continue to hear from members interested in volunteering. Please continue to contact us if interested. We will find activities for all to participate. It may take some time as our activities are clearly limited for now. But, as you can see, we are still moving forward adding content and member value. I look forward to everything getting better as we progress through 2021.

Trevor Craney

Upcoming ASQ RRD Webinars

Date: Thursday March 11, noon Eastern Time

Topic: Robustness Thinking in Design for Reliability – A Best Practice in Design for Reliability

BY: Matthew Hu

Date: Thursday April 8, noon Eastern Time

Topic: Analysis of Survival Data in Engineering, Business, and Medicine

BY: Wayne Nelson

Calling all Webinar Authors!!

Dave Auda (davidauda@yahoo.com)

We would like to extend an invitation on behalf of the ASQ Risk and Reliability Division (ASQRRD). If you would be interested in being a presenter of an ASQRRD webinar, contact Dave Auda. Webinars run every 2nd Thursday of the month at noon EDT for 1 hour,. The content should be something that the attendees can use, Reliability-related knowledge and/or skill.

Why present? A large potential audience that we invite, an additional entry to your resume demonstrating competence, refine your skills, AND earn recertification points.

If you have need of support in developing, preparing and/or presenting at such an event, we can support. Become a recognized subject matter expert!

KEY HIGHLIGHTS

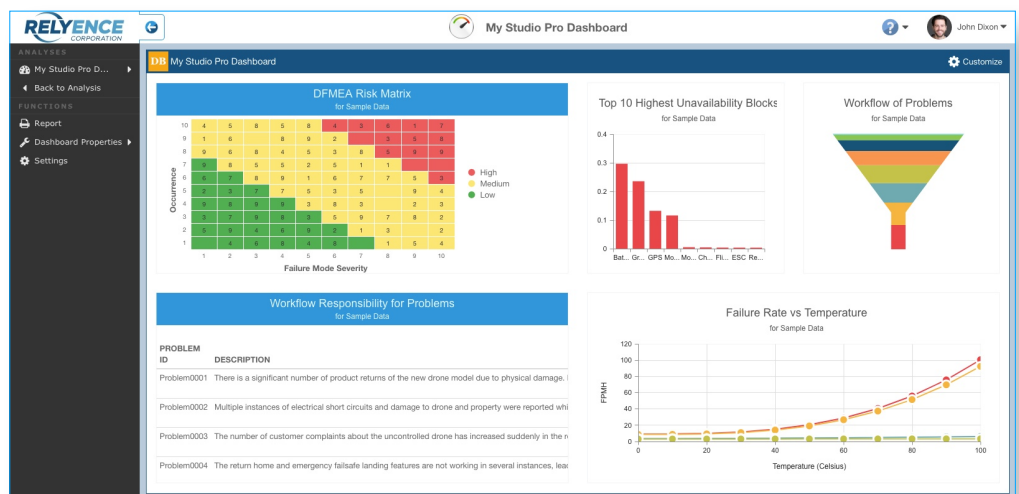
- Integrated suite
- Stand-alone tools
- FMEA, FMECA
- FRACAS, CAPA
- Fault Tree
- Reliability Prediction
- Reliability Block Diagram
- RCM, Maintainability
- Weibull
- ALT
- Browser-based
- On-premise or cloud-based
- Training and implementation
- Knowledgeable tech support
- Free, no install trial

FMEA · FRACAS · Fault Tree · Reliability Prediction RBD · RCM · Maintainability · Weibull · ALT

Relyence® offers a complete solution for all your reliability and quality software needs. Along with our software tools, we offer top-notch technical support, implementation services, and training.

The Relyence Solution. Providing seamless integration between FMEA (including Process Flow Diagrams and Control Plans), FRACAS, Fault Tree, Reliability Prediction, RBD, RCM, Maintainability, Weibull, and ALT analyses, the Relyence tool suite empowers you to effectively manage your products throughout their lifecycle. You can use each module stand-alone, or combine the tools you need in our Relyence Studio integrated platform.

Power & Innovation. Relyence tools offer an impressive list of features. Just a few of the highlights include: customizable cross-module dashboards; user-interface customization; flexible report generation; data importing and exporting; API functionality; device libraries; workflow, approvals, and notifications; user and group roles and permissions; and Relyence innovations such *always-in-sync™* technology, *smart-layout*, *Knowledge Banks™* for lessons learned reusability, *FMEA-Fault Tree link-sync™*, and *Intelligent Part Mapping™* for device decoding.



Flexibility & Collaboration. All Relyence tools can be accessed from any computer, PC, Mac, laptop, tablet, or smartphone for ultimate flexibility and team collaboration. You can use Relyence either as an on-premise installation on individual computers or a network, or as a zero-client, browser-based platform with your data hosted in the Microsoft cloud or in your own private cloud. The choice is yours!

Rely on Excellence. In conjunction with our software tools, we provide world-class services to help ensure your success. Our Implementation and Training teams can get you up to speed quickly, and our Technical Support team consistently provides support that is unparalleled in the industry.

TRY FOR FREE

RAMS 2021 Program Matrix

Time	#	A	B	C	D	E	Date	
		Grand B	Salon 3-4	Salon 5-6	Salon 7-8	Salon 9-10		
8:30 - 10:00		General Chair's Welcome & Keynote - Grand A-B						Monday May 24
10:15 - 12:15	1	An Introduction to Probability Models in Reliability & Maintainability	Intro to Fractional Failure & Its Application in Reliability	Business Process Improvement	Big Data & IoT Applications			
13:30 - 15:30	2		Integrating Physics with Sensor Data for System Health	Reliability & CBM Modeling		Maintenance Modeling & Methods 1		
15:45 - 17:45	3		Impact of Key Characteristics on Product Safety, Quality, and Reliability	Model Based Engineering & Testing	FMEA 1			
17:00 - 19:00	4	Virtual Exhibitors Reception						
7:45 - 8:00		Chairman's Corner - Grand A						Tuesday May 25
8:00 - 10:00	5	Introduction to Life Data Analysis	Probabilistic Analysis and Design		Reliability Modeling Design for Stress	Diagnostics & Prognostics 1		
10:15 - 12:15	6		Complex Problem Solving & Directed Acyclic Graphs	Artificial Intelligence Autonomy		FMEA 2		
13:30 - 15:30	7	Introduction to Fault Tree Analysis	A New Science for Reliability		SW Rel Aging & Rejuvenation	System Safety		
15:45 - 17:45	8		Reliability & Availability Modeling in Practice	Reliability Mgmt & Growth		Reliability Applications in Space		
7:45 - 8:00		Chairman's Corner - Grand A						Wednesday May 26
8:00 - 10:00	9	Monte Carlo Method & Reliability Applications Using Excel	Introduction to Maintenance Models		Life Data Analysis	Reliability Applications in Aircraft		
10:15 - 12:15	10	Advisory Board Panel - Grand C-D						
13:30 - 15:30	11	Machine Learning for Prognostics & Health Management	Dynamic Reliability & Artificial Intelligence		Dynamic Reliability Modeling	Reliability & Risk Management Analyses		
15:45 - 17:45	12	How to Analyze Repair Data	Design of Experiments for Reliability	Diagnostics & Prognostics 2	R&M Computational Methods			
18:30 - 21:30		General Reception & Banquet - Ballroom A						Thursday May 27
7:45 - 8:00		Chairman's Corner - Location: GRAND A						
8:00 - 10:00	13	Effective Design Verification Plan & Report (DVP&R) for Reliability	Introduction to Software Reliability Models		Maintenance Models & Methods 2	Reliability Applications in Aerospace Modeling		
10:15 - 12:15	14	737 MAX System Safety & Reliability Lessons Learned	Combined Environments Stress Screening	Reliability Allocations & Supportability Modeling	Prognostics & Health Management			

Legend	(T) = Tutorial	(PN) = Panel	(PS) = Paper Session
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RAMS® 2022 CALL FOR PAPERS & TUTORIALS

Theme: **“Opportunities for Machine Learning in R&M”**

ABSTRACT SUBMISSION DEADLINE — Friday, April 16, 2021

The 68th Annual Reliability & Maintainability Symposium (RAMS®) will be held at the Hilton El Conquistador Resort, Tucson, Arizona during the week of January 24–27, 2022. The theme for RAMS® 2022 is **“Opportunities for Machine Learning in R&M”**. With the advent and emergence of significant data availability for fielded equipment. Reliability assessment can now be accomplished through the collection and timely analysis of equipment-specific field data and health monitoring systems. Engaging advanced techniques, such as machine learning and other advanced analytics, with these data sets enable the state-of-the-art to evolve to a much more proactive, effective, and cost-efficient reliability management approach.

With this in mind, we invite you to share your theoretical or practical findings of your research, engineering case studies, success stories, lessons learned, R&M based analyses and simulations, or R&M discoveries at RAMS® 2022 Tucson. Tell us how you are designing, optimizing, and supporting systems (both hardware and software) through the execution of RAMS® disciplines. RAMS® is the premier forum for sharing your experience, knowledge, and road maps to success. Make your contribution to the advancement of the RAMS disciplines and enjoy participating in the rich exchange of ideas and solutions. We want you to contribute your unique experience to our synergistic symposium sponsored by eight professional societies. Start planning to submit your paper or tutorial now.

RAMS® seeks to provide a mix of papers and tutorials. Papers are the best medium to document advancements in the state-of-the-art research, and those accepted after being properly peer reviewed will be published. A short technical presentation with discussion period (approximately half an hour) will be given for each paper. It is the policy of RAMS® to publish all papers presented at RAMS® in IEEE Xplore. Tutorials provide exposure to more fundamental topics. Their technical depth ranges from introductory to advanced. Tutorials are presented in two-hour in-depth sessions. Examples of the most recent written papers and tutorials are available in the 2021 Proceedings and the 2021 Tutorial Notes. The process for presenting a paper or tutorial at RAMS® 2022 begins with your submission of an abstract. Your submittal should address topics pertinent to Reliability and Maintainability and that are relevant to our theme. Abstract topics are:

- | | | |
|---|---|---|
| Accelerated Life Testing | Human Reliability | R&M Applications in Supportability |
| Autonomous Systems and AI | Knowledge Based Training | R&M and Quality Appl. in Communications Design & Mfg. |
| Availability | Life Data Analysis | R&M Management |
| Big Data and IoT Applications in R&M | Maintenance Models and Methodologies | Reliability Modeling |
| Business Process Improvement | Physical Reliability Models | Reliability Growth Analysis |
| Design Optimization Using R&M Techniques | Prognostics and Health Management | Repairable Systems |
| Discrete Event Modeling & Simulation | Quality Appl. in Electronics Design & Mfg. | Risk Analysis and Management |
| Economic Models for R&M Equipment | R&M Applications in Aerospace | Security and Dependability Analysis |
| Diagnostics and Prognostics FMEA | R&M Applications in Health Care | Software Reliability and Testing |
| Fault Tolerance and Safety Critical Systems | R&M Applications in Infrastructure Management | Software Safety |
| Fault Tree Analysis | R&M Applications in Manufacturing | System Safety Analysis |
| | R&M Applications in Service | Warranty Data Analysis and Management |



RAMS® 2022 Call for Papers & Tutorials

Theme: **“Opportunities for Machine Learning in R&M”**

Abstract Submission Deadline – Friday, April 16, 2021

If you wish to present a paper or tutorial at RAMS® 2022, now is the time to begin your preparation. To have your paper or tutorial considered, you must first submit an abstract describing the paper or tutorial. The paper must represent your original work and should not be published or presented in any other journals or conferences. Tutorials must address key areas of broad interest in reliability and maintainability engineering.

Abstracts must be submitted via rams.org and the abstract submission process will be available from March 1, 2021, until April 16, 2021.

To submit an abstract for a paper or tutorial, an author must provide the following:

- A title of no more than 80 characters
- An abstract (all text—no equations, figures, or tables) of no more than 1000 words
- Names and contact information for all authors
- An indication of which author will present the paper (if it is accepted for the Symposium)
- Relevant topic areas for their abstract (from the list on the previous page of this Call for Papers)

The name(s) of the author(s) should not be included in either the title or in the abstract.

Authors will also be asked to indicate if any authors are full-time students (to assess qualification for the RAMS® student paper award), and to which (if any) of the nine RAMS® sponsoring societies each author belongs. Membership in a RAMS® sponsoring society is not required for acceptance. Each author can submit no more than four paper abstracts and no more than four tutorial abstracts for consideration. Authors cannot be added to a paper or tutorial after the abstract submission deadline.

The abstract submission procedure for papers and tutorials is the same with the following exceptions: they both use different links to upload the abstracts, each paper can have no more than four authors and each tutorial can have no more than two authors. Upon receipt of your abstract, you will receive a confirmation e-mail from RAMS® that your abstract was received. Therefore, it is critical that all authors provide and maintain a valid e-mail address that can accept e-mails. If an author moves or changes addresses, the author must provide their new contact information to the RAMS® Program Committee.

Note that all correspondence regarding papers and tutorials will be sent to the e-mail address of the author who submits the abstract.

Review Procedure for Abstracts and Associated Papers

In May 2021, the RAMS® Program Committee selects

abstracts that will proceed to develop draft/candidate papers and tutorials. Selections are based on innovativeness, technical merit, clarity, and relevance to the Symposium theme and topics listed previously. Authors will be notified of abstract approval in June 2021. Authors are required to submit complete drafts of both the paper and presentation slides by the end of July 2021. Draft or candidate papers shall be submitted without author identification on the paper in order to accommodate a blind peer review. The specific requirements for papers and presentation slides will be communicated to authors in a timely fashion. Submitted draft papers will be subjected to review by the Program Committee and RAMS® Editorial Board. The draft papers will also be submitted to IEEE CrossCheck plagiarism detection tool. Authors will be given feedback on their draft papers and presentation slides by the end of August 2020 with follow on additional editorial changes as necessary.

Final paper and presentation slides are due by the end of September 2021. Final papers will be reviewed by both the Program Committee and the RAMS® Proceedings Editor. At this time, authors must also complete a RAMS® Copyright Form, and at least one author of papers must register (at a reduced fee) for the Symposium.

By submitting an abstract for a paper, the author is accepting the condition that a paper may be rejected at any time if the Program Committee determines that the author is failing to comply with RAMS® deadlines or policies, or if the Program Committee determines that the content of the paper is not of sufficient quality to merit publication in the Proceedings. For more information contact the Program Chair at programs@rams.org. The author is accepting the condition that if their paper is ultimately accepted into the Proceedings, at least one author on the paper will attend the Symposium, and present the paper at the Symposium in reasonably fluent English.

Review Procedure for Tutorials

The review procedure for tutorials is identical to the review procedure for papers except that they are reviewed by a Tutorial Committee and are not subjected to a blind review. Authors of accepted tutorials receive gratis registration for Symposium. For more information, contact the Tutorials Chair, at tutorials@rams.org.

By *submitting an abstract for a tutorial*, the author is accepting the condition that if their tutorial is ultimately accepted for the Symposium, the author and/or co-author will attend the Symposium and deliver the tutorial at the Symposium in reasonably fluent English.

2020-2021 ASQ-RRD LEADERSHIP POSITIONS

Elected Positions

Chair

Trevor Craney
tacraney@yahoo.com

Chair-Elect

Tim Gaens
tim@asqrrd.org

Secretary

Rong Pan
rong.pan@asu.edu

Appointed Positions

Membership Chair

Tim Gaens
tim@asqrrd.org

Nominating Chair

Jim Breneman
weibullman@gmail.com

QE Best Paper Award Chair

Rong Pan
rong.pan@asu.edu

Newsletter Editors:

Jim Breneman
weibullman@gmail.com
Mohammad Pourgol-
Mohammad
mpourgol@gmail.com

Social Media:

Tim Gaens
tim@asqrrd.org

Webmaster:

Tim Gaens
tim@asqrrd.org

Marketing

Angleat Shelikoff
adshelikoff@gmail.com

Webinar Outreach

Executive Producer & Speaker Manager: David Auda (davidauda@yahoo.com)

Chinese Host: Frank Sun (franksun99@yahoo.com)

English Hosts: David Auda

Spanish Host: Norma Antunano (normaantu@aol.com)

Data Analysts: Rachel Stanford (stanford.rachel@gmail.com), Tim Gaens

Video Editor: Tim Gaens (tim@asqrrd.org)

Contact Trevor (tacraney@yahoo.com) to volunteer with us today!

1. Discrete random variable, X, follows the following probability distribution:

X	0	1	2	3	sums
P(X)	0.15	0.25	0.4	0.2	
XP(X)					
X ² P(X)					

What is the Mean, Std Dev?

A. 1.65, 13.4 B. 1.65, 3.65 C. 3.55, 1.65 D. Not A, B, or C

2. Given a part with Strength distribution Normal (25,6) and a Stress distribution Normal (10,6), what is the Reliability?

A. 0.975 B. 0.610 C. 0.961 D. ~0.75

3. Which one of the following is NOT a description of Reliability Engineer's responsibilities regarding product safety?

A. Coordinate safety compliance tests

B. Perform root cause analysis and coordinate corrective action for safety test findings

C. Apply and complete safety agency certificates D. None of the above

4. Which of the following failure modes is not usually caused by material subjected to high or low temperatures?

A. Softening and weakening B. Chemical changes C. Mold growth D. Reduced viscosity

5. The use of stress-strength analysis in modern DFR (design for reliability) is an example of:

A. Deterministic design B. Probabilistic design C. Data mining design D. Design for maintainability

6. In a design FMEA activity, the use of a design verification test to verify proper function over expected life is an example of which of the following?

A. Prevention design control B. Detection design control

C. Both a prevention and a detection design control D. Compensatory design control

7. The intent of a recommended action in a Design Failure Mode Effects Analysis (DFMEA) is to reduce rankings in which of the following orders of priority?

A. Severity, Occurrence, Detection B. Occurrence, Severity, Detection

C. Severity, Detection, Occurrence D. Occurrence, Detection, Severity

8. A cargo ship's navigation system includes two identical Global Positioning System (GPS) units. The secondary unit is in standby mode and is employed only in the event that the primary GPS unit fails. What is the 500-hour reliability of the navigation system if each GPS unit has a failure rate of 0.00005 failures/hour and the switch over to the secondary system is considered to have a reliability of 1?

A. 0.9994 B. 0.9512 C. 0.9350 D. 0.9997

9. Which of the following best describes a limitation of Parts Count Reliability Prediction?

A. Some failure modes are not due to part (component) failures.

B. Parts used in the design may be newer technology.

C. Specific customer usage or environmental profiles are not fully considered.

D. All of the above

10. Failure mechanisms in which three of the following would most likely be found through random vibration testing?

I. Fatigue II. Heat sink mounting III. Large component mounting IV. Circuit design margin

A. I, II & III

B. I, II & IV

C. I, III & IV

D. II, III & IV