Reliability & Risk Division
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Reliability & Risk Newsletter

December 2019 Edition

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Check out our website at:
http://www.asqrrd.org/

CHAIR'S NOTE

Dan Burrows
Chair, ASQ Reliability & Risk Division
d1c1b1@hotmail.com

Hello ASQ Reliability & Risk Division Members,

I hope that 2019 continues to go well for you in your professional and personal lives.

The ASQ Reliability & Risk Division had a successful Reliability, Maintenance, and Managing Risk Conference (RMMR) in October in San Antonio, TX. Trevor Craney, Jim McLinn, John Bowles, Tim Gaens, Jim Breneman, Dan Conrad, JD Solomon, Rong Pan, and otherswho supported this effort did an outstanding job. It was a great way to celebrate the 50th Anniversary of our Division by providing value to our members.

Next up is the Reliability and Maintainability Symposium (RAMS) on January 27-30, 2020 in Palm Springs, CA. JD Solomon will be doing a post conference course, Practical Development and Application of Risk Management Framework, so plan on making it an extended week of learning and networking with fellow Reliability and Risk professionals. Register at www.rams.org .

Our Webinar efforts continues to be strong and deliver value to you every month. And Tim Gaens and Angleat Shelikoff continue to provide value to you through our website and communications.

This will be my last Chair's Note to you. Some of you are aware that my tenure of service for 2018-2019 has coincided with ASQ Transformation which has taken much of the wind out of our sails as the ASQ Board of Directors and ASQ Headquarters have diverted the majority of ASQ's efforts and funds towards attempts to lure corporate clients and away from serving individual Members.

As it stands, 75% of ASQ's budget is devoted to the Business-to-Business Unit at ASQ Headquarters and only 7% of your dues actually goes to your Division or Section. Millions of dollars of Division reserves and investments have been centralized and are being transferred to ASQ Headquarters to cover the losses that are trying to turn ASQ into a business have caused. And the same is happening with Section reserves and investments. ASQ now projects that 2019 membership will decline 5% and ASQ will end the year with yet another $2 million deficit.

You can see all of this for yourself if you read the history of ASQ Board of Directors meeting minutes - https://asq.org/about-asq/how-we-do-it/bod-min-full and ASQ Annual Financial Statements - https://asq.org/about-asq/how-we-do-it/financial-statements .

Chair note continued on page 2….

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Chair note (continued):

Our Division has tried to carry on and we have actually managed to grow and keep our member retention numbers up, but this will be even more difficult since we were recently informed that funding to Sections and Divisions, which was supposed to be secure by ASQ's own policies, will be cut by 60% in 2020.

I have and always will maintain that ASQ is here to serve the Members of ASQ and not be transformed into some sort of business, especially when that business is losing millions of dollars of Society funds per year. And I have and always will maintain that Divisions, Sections, the ASQ Board of Directors, and ASQ Headquarters exist to serve the Members of ASQ and not the other way around.

For 2020-2021, our leadership team will be Trevor Craney – Chair, Tim Gaens – Chair Elect, and Rong Pan – Secretary. I wish them much success in leading the ASQ Reliability & Risk Division forward. Please do encourage and support them as well.

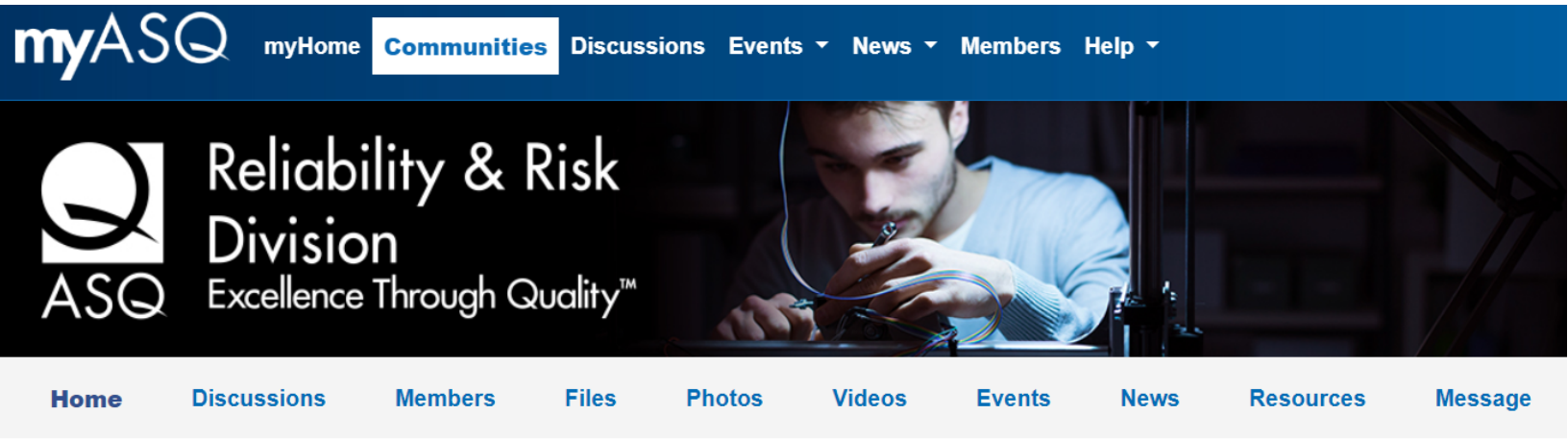
Best Regards,
Dan Burrows
Chair - ASQ Reliability & Risk Division

ASQRRD website moving to MYASQ

Welcome to MyASQ

As announced we will move to MyASQ with all our news and information. This is part of the ASQ transformation.

This means that from today onward we will be "live" at ASQ's MyASQ https://my.asq.org/communities/home/182



For the time being the website will keep on existing, but will slowly fade out.
So please keep a close eye on ASQ Reliability and Risk Division on MyASQ

Webinar Roundup!!

Upcoming ASQ RRD *Webinars*

1. ASQ RRD Series: Engaging Millennials in the Workplace

Date: Dec 12, 2019, 12:00 PM EDT

Presenter: David Disney

Abstract:

"With multiple generations now sharing the workplace there have been numerous observations about the differences in value systems, expectations, worker loyalty, etc. between groups of the Millennials (Born 1981-1996 (22-37 years old), Gen Xers (Born 1965-1980 (38-53 years old) and the baby boomers (born 1946-1964 54-72 years old). This interactive webinar will discuss the particulars of how the Millennials are integrating and progressing in the professional ranks."

2. Deriving Safety from the Quality and Reliability disciplines

Date:Thu, Jan 9, 2020 12:00pm EST

Presenter: Dave Auda

Abstract:

"Safety is a topic that usually gets lots of attention when it fails. This webinar will discuss Unsafety. The objective of the webinar is to clarify the distinctions and dependencies between and among Safety, Reliability and Quality. Material content will include coverage of emerging tools/methodologies intent on improving the prevention of Unsafety in complex systems."

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!

Webinar recordings and slides

https://www.asqrd.org/slides-and-video-of-software-fmea/
https://www.asqrd.org/slides-and-video-of-systems-theoretic-process-analysis/
http://www.asqrd.org/slides-and-video-of-how-aging-laws-influence-parametric-and-catastrophic-reliability-distributions/

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QE Best paper Award CALL FOR PAPERS!

$1000 Annual Award for Best RELIABILITY Paper!

Quality Engineering is a technical journal of ASQ published by Taylor & Francis. It is directed to professionals in all engineering and management fields interested in quality and reliability improvement.

Continuing with the Reliability & Risk Division's mission to publish more technical papers with reliability topics, we have an ongoing call for reliability and risk related papers to be submitted to Quality Engineering. A special issue on Reliability Engineering has been scheduled for the 3rd issue of 2020 of Quality Engineering. All papers having at least one author as a member of the ASQ Reliability & Risk Division will be considered for our annual best paper award, which carries a $1000 cash award and a plaque presentation at our annual banquet. Submissions should be made through http://mc.manuscriptcentral.com/lqen. Due date is December 31.

Announcing the 2018-2019 QE Best paper award

The best paper award committee has selected the following paper for the 2018-2019 QE best reliability paper award:

Jeff I. Abes, Michael S. Hamada & Charles R. Hills (2018), "Comparing methods for assessing reliability uncertainty based on pass/fail data collected over time," **Quality Engineering**, 30:4, 694-700, DOI: 10.1080/08982112.2017.1417600

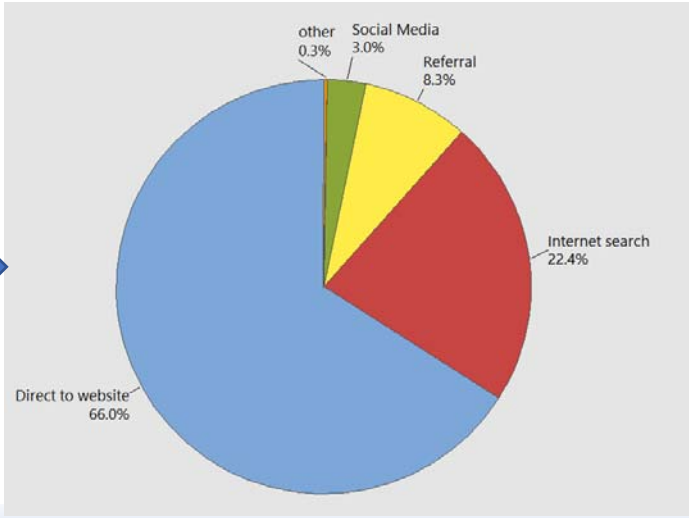
Webinar Statistics

– 10589 unique webinar registrations (Based on email addresses)
– 19017 RU's accountable (Total visits)
– Average 95 attendees (93 last report)
– 201 Webinars offered end of May 2019 (since 2010)

Social Media Status:

- 4173 Members on LinkedIn
- 645 + 205 Followers on Twitter
- Facebook 46 pagelikes

How are people learning about ASQ RRD?



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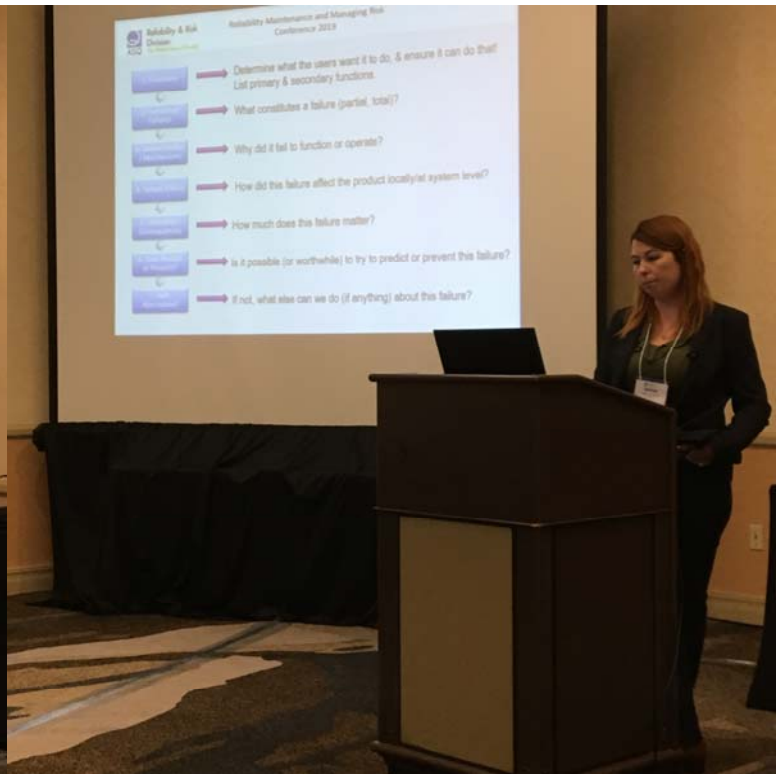
RMMR October 2019 Round-up

- The ASQ Reliability and Risk Division's 50th anniversary was celebrated this year with the inaugural Reliability, Maintenance & Managing Risk (RMMR) conference on October 15-16 in San Antonio, TX. The conference was a success with about 50 attendees representing several countries. The pictures here show Jim McLinn, the conference Program Chair, and Rachel Stanford - in attendance from Scotland - presenting. Jim McLinn also taught a pre-conference course on Accelerated Life Testing that was very well attended. While not the primary concern, the conference did also manage to return a small profit to the division. We are planning the second RMMR conference to occur in August, 2020 in Napa, CA. It will feature pre and post-conference courses and we are using feedback received from the first conference to improve the experience further for attendees, which will include reduced cost for attendance. David Auda has accepted the role of conference general chair for 2020, and will ensure that the conference committee creates an exceptional conference program and experience.



RELYENCE CORPORATION

Reliability & Quality Software

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

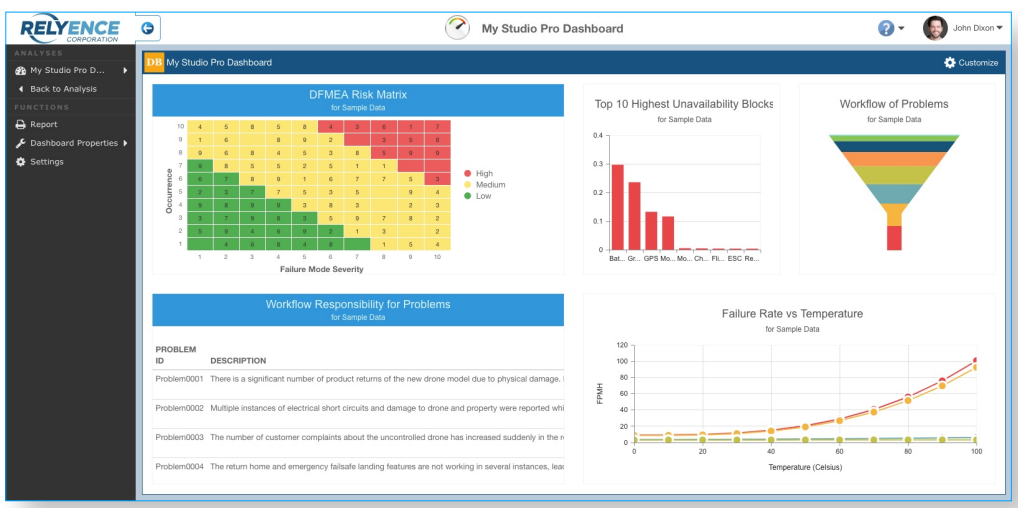
KEY HIGHLIGHTS

- Integrated suite
- Stand-alone tools
- FMEA, FMECA
- FRACAS, CAPA
- Fault Tree
- Reliability Prediction
- Maintainability
- Reliability Block Diagram
- Weibull
- Browser-based
- On-premise or cloud-based
- Online or in-person training
- Implementation services
- Knowledgeable tech support
- Free, no install trial

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, Maintainability, RBD, and Weibull 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 Bank*™ for lessons learned reusability, and FMEA-Fault Tree *link-sync*™.



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

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RAMS® 2020

The 66th Annual Reliability & Maintainability Symposium

Attend the 66th Annual RAMS® 2020: January 27-30, 2020

At The Marriott Renaissance Palm Springs Hotel

"R&M in a Model-Based System Engineering Environment"

RAMS®2020 is the premier educational and networking event for the reliability, availability, and maintainability engineering disciplines.

5 Reasons to Attend:

1. Take actionable knowledge back to your organization
2. Apply learning to create more efficient & effective reliability programs
3. Make valuable contacts by networking with industry leaders & professionals
4. Gain new skills, CEUs, certifications and advance your career (ASQ exams, CRE, CQE)
5. Extend your stay and enjoy a fabulous family vacation at the spectacular Marriott Renaissance Hotel in Palm Springs, California

- Tutorials - basic to advanced
- Technical paper sessions
- Panel sessions
- Keynote presentations
- Exhibits by leading companies
- CEUs
- Certificate program
- Networking opportunities

Message from RAMS 2020 General Chair, Dr. Julio Pulido

The planning for another blockbuster RAMS symposium is well underway! We invite you to take full advantage of this premier international forum for gaining and sharing knowledge in Reliability and Safety. RAMS is a cost-effective way to learn from subject matter experts in a wide range of industries (including Aerospace, Automotive, Data Centers, HVAC, Medical, and more) who will present cutting edge papers and tutorials.

Register at rams.org

ASQ Reliability Division

ASQ Electronics and Communications Division

SPONSORING SOCIETIES

IEEE Reliability Society, SAE International, AIAA, IEST, SRE, SSS, IISE

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ASQ Reliability & Risk Division (RRD) workshop during RAMS 2020

The workshops will cover the Practical Development and Application of Risk Management Framework. The workshop will be held on Thursday afternoon January 21st, 2020 and Friday morning February 1st, 2020. More info on http://www.rams.org/

Practical Development and Application of Risk Management Framework (1 Day)

The workshop will provide a comprehensive overview of risk and risk management frameworks. An overview of risk management will be provided that includes the general components of a risk the ISO 31000 risk management framework, including elements of risk assessment (identification, analysis, and evaluation), risk treatment, communication, and monitoring. The emphasis of the workshop will on applications associated with industrial facilities and infrastructure and will include both design-phase and maintenance-phase perspectives.

Major components of the workshop include:

- Foundational definitions, including relationships such as risk & uncertainty and risk & reliability
- Competing risk frameworks (ISO 31000, COSA, others)
- Establishing organization and problem context
- Qualitative versus quantitative approaches
- Risk assessment
- Tools for risk identification and risk analysis
- Risk treatment
- Risk monitoring and review
- Risk communication
- Enterprise risk management

The workshop approach will be direct and practical. Insights will be provided into the strengths, pitfalls, and challenges associated with different situations that impact reliability, risk, and professionals working in different industry sectors. An emphasis will be provided on providing participants with practical “how” rather than theoretical “what” to do.

The workshop will be conducted by an experienced facilitator using lecture style presentation combined with interactive support tools such as an audience response system (ARS), small group breakout sessions, and several exercises to enhance the learning experience. The session material has been presented successfully in corporate and professional development settings.

The primary learning objectives include:

- Understanding of core risk and risk management definitions and concepts
- Ability to effectively apply the international risk standard, ISO 31000
- Determining the applicability of qualitative and quantitative risk approaches
- Evaluate 24 risk tools and their applicability to practical situations
- Incorporate the role of cognitive biases and risk appetite into decision making
- Apply good practices for practical implementation of risk treatment and mitigation strategies
- Understanding risk tracking in the context of enterprise risk management systems

The workshop is targeted at the intermediate level. It is applicable to a full range of reliability, risk, quality, safety, security, and financial professionals.

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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

Regional Counsellors Coordinator
Dan Burrows
d1c1b1@hotmail.com

QE Best Paper Award Chair
Rong Pan
rong.pan@asu.edu

Newsletter Editors:
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Spanish Host: Norma Antunano (normaantu@aol.com)
Data Analysts: Rachel Stanford (stanford.rachel@gmail.com), Tim Gaens
Video Editor: Ward Baun (wardbaun@gmail.com)

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

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Autonomous Vehicle Safety Considerations

A congressional briefing on Capitol Hill on "Advancing Safety Technologies for Autonomous Vehicles," with the purpose of informing Members of Congress and congressional staff on safety challenges associated the advancement of autonomous vehicle (AV) technology. A short summary of the presentation given by Dr. Mohammad Pourgol-Mohammad, ASQ Senior Member is as below:

"What is 'acceptable risk?" and, do AVs need to be "as safe as" or "safer than" traditional vehicles? A challenge in risk analysis is to identify everything that can go wrong. How can we deal with the unknown unknowns? To answer these questions, the specifications of the autonomous vehicles (AVs) with respect to their safety, reliability and security (SRS). An AV system is characterized as a system of cyber, physical and human entities with a socio-technical, regulatory and physical environment. The biggest challenge is the heavy interaction between hardware, software and human in various ways (e.g. functional, information, physical --matter, energy and force) in addition to unknowns. How can risk assessments techniques and risk models of autonomous systems take "shared control" and "adaptive autonomy" sufficiently? The challenges are: the propagation of failures in many different failure scenarios, lack of coordination of elements' behaviors, and failure masking.

Specification of AV systems includes (1)heterogeneity, (2)complexity, (3) openness, (4) learning ability and (5) number of risk event scenarios. For example, the complexity of software and human failures is higher than hardware failures, and past failures do not indicate future behavior which means that calculation of the expected likelihood or frequency is not feasible. Potential learning capabilities of the software increase the difficulty in validating performance. The "Big data domain" of lots of sensors and data collecting devices and the uncertainty in sensor data adds more challenges to evaluation of the AV systems SRS assessment.

To add to an already complex AV specification, the difficulty of SRS assessment includes: (1) functional and physical distribution, (2) inter-connectivity of technology and social dimensions, (3) high levels of integration of the technical and social dimensions (highly interconnected socio-technical systems), (4) very high pace of development and deployment, and higher levels of diversity of supply chain, subject to different levels of quality, reliability, and safety standards.

How should this uncertainty be handled in the design and operation of autonomous systems and operations? There are various assessment techniques currently in place, including software failure modeling and planning for external environmental causes. These technique include the techniques for SRS assessment of critical mission systems like aerospace and nuclear facilities, , phenomenological, event based and logic based methods, hardware or soft casual Relations and many more. Many of the current methods can still play a part in supporting SRS of autonomous systems; however, many areas require new modelling techniques to be developed:

-Traditional modeling and analysis methods have significant limitations

-Data driven methods are inadequate to demonstrate safety

-Identification of large number of options of environment, operation modes

-Methods to address Software failures and security

-Inclusion of human role both positive (operators) and negative (Hackers) with their

complexity of their involvement

In order for many of safety questions to be answered, new modelling techniques will need to be developed. Holistically modelling techniques are promising techniques capturing connectivity and interdependencies. Simulations may assist in the detailed understanding of autonomous systems behavior, identification of SRS issues, and performing system validation. Importance of quantifying SRS may increase in the future to enable real-time decision making and to identify when the system performance drops below the acceptable threshold during operation.

Mohammad Pourgol-Mohammad, Ph.D, P.E.

ASQ Senior Member

TECH SPOT: SAMPLE CRE QUESTIONS (Part 8)

1. Given the density function obtained under accelerated conditions: $f(t) = \frac{1}{30}\exp\left(-\frac{t}{30}\right)$
Determine the density function under normal operating conditions, given an acceleration factor of 5

a. (1/150)exp(-t/150) b.(1/6)exp(-t/6) c. (1/30)exp(-t/6) d. (1/30)exp(-t/150)

2. Which of the following is NOT a type of sample?

a. acceptance sample b. SPC sample c. Application sample d. Measurement system correlation sample

3. Failure rate derating curves are not dependent upon:

a. Environmental stresses b. Operating life c. Failures per hour d. Component application levels

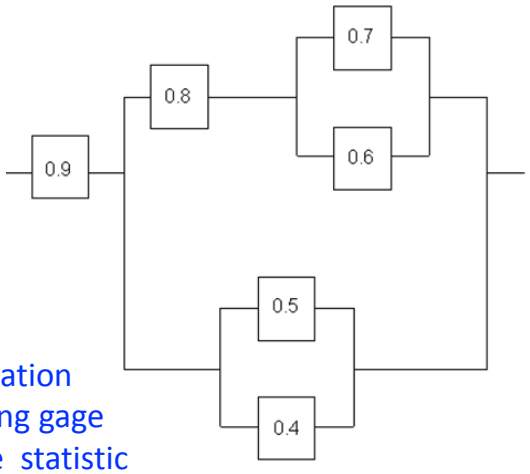
4. FMECA classifies each failure mode according to:

a. Probability b. Criticality c. Severity d. Unreliability

5. Allocation of functions to personnel and equipment in combinations to achieve the required reliability is defined as

a. Human Factors allocation b. Design Factors allocation
c. The function allocation d. Cross-functional allocation

6. The reliability of the logic diagram to the right is:



a. 0.1800 b. 0.5918 c. 0.7796 d. 0.8201

7. What does the failure mode and criticality number (C_m) replace in the most common qualitative methods?

a. Severity number b. Risk Priority number
c. Failure Effects Number d. Failure mode number

8. Two gages are used to inspect an item, yours and a supplier's. A correlation sample of n=25 units was inspected using both gages. The std dev using gage #1 is 20, using gage #2 it is 30. What is critical value of the appropriate statistic to test the null hypothesis that the variances of both gages are equal at 5% significance (1-sided test)?

a. 1.98 b. 2.25 c. 4.85 d. none of the above

9. The acceleration factor for increasing vibration from 50 units to 200 units is 6.4. At a vibration level of 200 units, the time to failure is lognormal with a scale parameter of 0.8 and a location parameter of 3.2. What is the reliability under normal conditions at time=100?

a. 0.7136 b. 0.8271 c. 0.8361 d. none of the above

10. The equation below represents:

$$\ln t = \ln a + \frac{b}{T} + c(-\ln V)$$

a. the Weibull distribution transformed for probability plotting
b. the Arrhenius model
c. the lognormal hazard function
d. the linearized Eyring model

Answers will appear on ASQRRD blog by Jan 15