

A family tradition: from rigging pioneers to polished professionals

BY JOE ALLEN

TRADITION IS AN ABIDING REMINDER of our origins. It's the honor due to the men and women who made our existence as riggers possible. This year's New World Rigging Symposium was rich in tradition, but as its name implies, the gathering was held at the tumultuous crest between past and future. Those who came before us risked life and limb to establish the art of the impossible. Many fell along the way. Many more saw the sky come crashing down, or at least significant chunks of it.

As heirs to that tradition, we face the highs and lows of a widening field of possibilities. New tools, and the skills to use them, will be necessary to solve novel problems. New protocols will be advanced. Some will succeed, others will fail. There will be exhilarating highs, but as we contemplate our duty to protect against disaster, the looming specter of sudden impact reminds us to keep the mind clear and eyes wide open.

A man from the before times

In keeping with tradition, rigging pioneer Rocky Paulson delivered the keynote address and received ESTA's Lifetime Technical Achievement Award at the symposium's close. Let me tell you, this man has lived the life.

Rocky joined the Navy at 17, serving as a reactor operator on a nuclear submarine. Speaking with me in the hotel lobby, he

explained that this assignment taught him the value of applied mathematics and clear communication. After his service, he studied philosophy at San Jose State University. I was intrigued to learn that the young Rocky was deeply moved by the existentialist thesis of Peter Koestenbaum's *The Vitality of Death*: an acute awareness of mortality allows us to affirm the sweetness of life.

Now climb that wire rope ladder.

As a "broke college student," Rocky set up lights for San Francisco's concerts on the lawn for a scant \$2 an hour. Yes, he carried PAR cans barefoot in the snow, sweating in his coat under the hot California sun. Soon after, he joined IATSE Local 409 (now merged with Local 16) as one of two riggers willing to climb the high steel at the Cow Palace.

In 1973, he joined the now legendary "Disney Riggers," led by his mentor, the one-time human cannonball Roy Bickel, whom Rocky rightly calls the "Godfather of Rigging." Rocky went on to tour with Jethro Tull and Pink Floyd, and in 1977 founded Stage Rigging with his lovely wife Paula.

At the sprightly age of 75, Rocky is still going strong. During his address, he informed the stunned crowd that he'd just completed his SPRAT 1 certification. He was primed for the effort, he later told me, because he'd spent the previous month hiking the treacherous Caminito del Rey in Spain. The year before, he sailed from the Falkland Islands to Antarctica on the massive hundred year-old sailing rig, Bark



Rocky Paulson had attendees of the New World Rigging Symposium on the edge of their seats with his keynote address.

Europa. Of course, he helped with the rope work.

Rocky's old enough to remember when rock 'n' roll baskets didn't exist. In those days, arena climbers simply wrapped wire rope around the beam and secured it with Crosby clips. Hardware rained down like steel hailstones. It was an archaic time, when riggers used an old Klein tool bag to capture the hoist's chain, when wooden block-and-falls were high technology, when



“Challenge Accepted! Creating the Unknown: A Case Study” panelists Alex Serrano, Colin Peters, and Jim Shumway

a “harness” was just something cowboys put on a horse—if they were too chicken to ride bareback, that is.

With a perennial grin on his kind face, Rocky told me war stories about being a Disney Rigger in the 1970s. Every day, Roy Bickel insisted that his team climb up a 50' circus web (basically, a canvas firehose with a rope inside) in order to stay in peak physical condition. Paulson described the terror of underclimbing I-beams in the old Charlotte Coliseum, of surviving electrocution while hanging over a truss (his vainglorious spotter was chatting up a reporter—ha!), of seeing Joe Branam do handstands on steel girders a hundred feet in the air.

Such images tend to evoke horror or derision in those who’ve never experienced the thrill of open steel. They inspire relish and envy in those who have.

Was this the same Rocky Paulson who, decades later, helped write the ANSI wire rope ladder standard? The man who would load test and advocate horizontal life lines, saving God knows how many lives? I asked Rocky if he thought today’s riggers were losing something vital with increasing safety measures. His answer, given with a grin, was emphatic: “We’ve learned that this is an industry, not a sport. ... If you want to prove yourself, there’s always free solo rock-climbing.”



“Entertainment Engineering: How to Get Everyone on the Same Page” panelists Bill Gorlin and Roger Bardwell

Can the blind foresee imminent danger?

Mike Kelly, Media Risk Control Manager for ProSight Specialty Insurance, opened the risk assessment panel by asking the crowd: “What is the single biggest risk in rigging?”

It seemed like a dozen people yelled “Gravity!” At one point, someone blurted “Stupidity!” In the end, Kelly concluded that the biggest risk is “Humans.” He’s right. Gravity only pulls down what we put up, and only if we fail to rig it properly. No creature on Earth is more dangerous than



“Mental Health in the Entertainment Work Environment” panelists Dr. John Draper and Eddie Raymond

a flawed, perceptually-biased, ego-driven human. Especially when he’s sleep deprived.

This psychological vulnerability was explored by safety consultant Dominic Housiaux, Principal of Lankey & Limey Ltd. A long-time rigger and technical scuba diver, Dominic is well-acquainted with the pressures of extreme conditions.

In Dominic’s schema, human psychology should inspire humility and self-examination. Even the best laid plans are apt to have a hole somewhere. No matter what organizational procedures, supervisory protocols, safe work conditions, or personal actions are implemented, accidents tend to find a way through. The primary culprit is the fallible brain.

Dominic directed our attention to the reticular formation nestled deep within our brain stem. This neural pathway

filters sensory input for what's useful, so that repetitive, mundane information doesn't ring our alarm bells continually. I immediately thought of how we learn to ignore hammer strikes on a steel build, or grow accustomed to dizzying heights on an arena grid. Without this function, life would be like a continuous acid trip in an alternate universe unregulated by stable laws of physics. That's no world for a rigger.

The problem is that the reticular activation system yields habit and inertia rather than critical thinking. Humans are prone to confirmation bias, Dominic explained. We tend to accept information that confirms our expectations, or even more troubling, that satisfies our desires. We see what we want to see. This is associated with the "gambler's fallacy," in which we tell ourselves that because we won before, we're sure to win again.

When applied to rigging practices, this could mean we repeatedly overload that thin spreader beam just because it worked the first time. Clearly it's strong enough. Right? Or maybe we send Rocky Paulson to underclimb an I-beam without a harness. I mean, he hasn't died yet has he?

"Lack of accident," Dominic warned, "is not proof of safety."

Formal risk assessment policies are a countermeasure to "normal human complacency." These artificial (and, I confess, frequently annoying) procedures snap us out of our perceptual biases and force us to examine the mundane for potential threats. Yes, the performer's harness is relatively new, but has it been compromised? The hardware is sound, but has it been installed correctly? Is every chain hook properly rendered?

Mike emphasized four key elements of a proper risk assessment: identify the risks involved; take every precaution to mitigate against them; document your due diligence; and finally, follow up to be certain you haven't missed something. In short, cover your ass, because no one's going to cover it for you.



"Measuring the Uncertainties: Understanding and Working with Load Cells" panelists Jeff Reder and David Bond



"Automation in a Theatrical Environment" panelists Loren Schreiber and Gareth Conner

How to exorcise ghosts in the machine

Hats off to the savant who, with a mere glance, can count the beans in a jar. Human intuition is often impressive, but we can't all be the Rain Man. When gauging the actual weight of a massive rig—especially one with moving parts—looks can be deceiving. "Measuring the Uncertainties: Understanding and Working with Load Cells" with David Bond, COO of Kinesys USA, and Jeff Reder, Principal of Clark Reder Engineering, was a great primer on an indispensable technology.

Every tour is different, and there are plenty of shows too light to justify extra expenses. However, if you're under a heavy rig, especially one with dynamic loads, it's probably best to acquire a load cell package.

There are numerous types of load cells, David explained, and their relative usefulness depends on the application. Wireless load cells are convenient and weather resistant, but they tend toward data loss, or frustrating delays, and are subject to radio interference and dead batteries. On the other hand, wired load cells give you constant connectivity and fast signals, but you also have to deal with cable management and weather-proofing.

Given the size and complexity of the top shows on the road, or major productions in residency, load cells are essential to assess indeterminate loads, guy wire tension, or massive dynamic systems.

How much force is on that point? With the proper tools, there's no good reason to guess.

Riggers and engineers: the last line of defense between dreamers and reality

Bill Gorlin, Vice President of McLaren Engineering Group's Entertainment Division, told the crowd that a successful partnership between engineers in the office and riggers in the field requires constant interchange. The former has expertise in tracing a load's path down to the last bolt. The latter has hands-on experience in hanging those loads.

One major problem faced by riggers everywhere is that shows are going into all sorts of new venues, but many buildings don't have accurate information on allowable loads. You may know the exact weight on each point, but will the structure support it?

A good engineer can provide both ethical reassurance and legal protection.

Clear communication is essential to this relationship. Bill listed a number of key questions a rigger should be ready to answer when consulting an engineer: What are the weights? How reliable are those numbers, i.e., were they generated by load cells, a catalog, or educated guesses? What sort of members are supporting the load? How are the attachments being made?

Then there is the human element. Are there people under the load? Are there people on the load? Are there dynamic effects from automation, performers flying, etc.? Do forces vary during the load in/load out sequence? Who is ultimately responsible?

Given that information, Bill will begin with hand calculations to determine the actual load on each member and the resultant load paths. From there, he uses computer analysis to create a wire-frame model of the system, representing each member as mathematical construct. Despite these now standard advances in technology, he cautions us that computer models are no replacement for the human mind. Without the subtle nuances of intuition and hands-

on experience, one is in danger of working toward a "computer-aided catastrophe."

Bill raised concerns about the unrealistic expectations of an up-and-coming generation who "didn't play in the woods." In a later exchange, he acknowledged that "while dreams are vital to the creative process, I worry that over-ambition which departs too far from reality is becoming too common on the design side. Younger designers exhibit brilliance in developing ideas with elaborate graphic visualization, but there seems to be a decreasing familiarity with what may be achievable in the real world. Increasingly more time is

spent in front of a computer screen and less time working with one's hands."

During the session, one attendee quipped: "We all know anything is possible with enough money."

"That's not true!" Bill shot back. "There's this thing called physics. ... [But] we push those limits as best we can."

Any excuse to be in the limelight

The finest minds will be required to fly the rigs of the future. Taking the stage with heads swollen like hot-air balloons, Tait



"Risk Assessment: Where Do I Start?" panelists Orestes Mihaly, Dominic Housiaux, and Mike Kelly



"Hiding in Plain Sight: Identifying Fall Hazards in Your Work Environment" panelists Peter Scheu and Bill Sapsis

project managers Jim Shumway and Alex Serrano boasted that they were able to live out every rigger's secret dream: they got to be part of the show. Granted, it was a Phish show—but who can choose gigs based on taste? The pair described the harrowing task of assembling a precarious rigging project last minute. Their goal was paradoxical, though not impossible: to maintain a safe environment under time sensitive conditions.

Every New Year's Eve, the iconic jam band unveils a surprise gag for their residency at Madison Square Garden. This year Tait Towers was brought in to realize the vision of a gigantic ship mast descending from the ceiling. Riggers in red overalls would descend on ropes, climb across the structure in sync, and guy it off so that it could rotate. Next they would deploy a massive sail in front of a packed arena. As the sail turned, wireless wristbands worn by the crowd would light up in an electric rainbow wave.

But how to put it together in less than a week?

With the assistance of Colin Peters, known to riggers around the world for his leadership at the Rock Lititz rehearsal

space, the team cobbled together the materials. Given the short timeframe and the holiday, even truss was hard to come by. The components of the rig were assembled piecemeal—some truss came from Tomcat, and couple of 5' sticks were actually borrowed from Metallica. After a few failed experiments, the sails wound up being blown by a row of cheap Air King fans.

Meticulous planning and ongoing analysis from Clark Reder Engineering were crucial. Too often, artists and designers approach a production with a "show must go on" attitude—but that's not how Jim rolls: "What *must* happen is everyone goes home under their own power."

As usual in the rigging world, various ideas flew around like newly hatched birds, only to be shot down by the next guy. Colin insisted that it wasn't a shackle-swinging contest, though. "Open-mindedness definitely helps—not a strong-headed, 'I'm right, you're wrong' type of mentality."

In the end, a few dreams took flight unscathed and a game plan was formulated. Of course, that's just the first step. The quick-witted Jim paraphrased Dwight Eisenhower: "Plans are worthless—



Students, back row, Ian Gammarino and Ben Ramos, and, front row, Carrie Hurst, Gabby Ullman, and Marie Pipinich enjoyed meeting and learning from many of the most experienced professionals in the industry. Thanks to Ian, Ben, Carrie, Gabby, and Marie who served as interns for the symposium and provided invaluable assistance.

planning is everything. ... An emergency, by definition, will not happen the way you thought it would."

Despite numerous unforeseen issues, the gag went off without a hitch. Phish noodled into the New Year as the crowd went wild. The band members were surely pleased with themselves, but every grid monkey knows that the real stars were the riggers.

The degree of education, experience, and professionalism it takes to pull off an impromptu production of this scale should be daunting and inspirational to those straining to reach the next level.

If it was easy, anybody could do it. ■

The next New World Rigging Symposium will be held in Houston, TX in conjunction with the USITT Conference and Stage Expo, March 31 – April 1, 2020. You can be certain that someone there will know something that you don't, so by all means, come with your best questions.



"Creating a Professional Work Environment" panelists Sarah Gascoine, Eddie Raymond, and Eric Rouse



"Engineering for Success: Why Things Don't Fall Down" panelists Tim Franklin, Steve Ehrenberg, and Rick Boychuk



Joe Allen has toured with *Game of Thrones*, Queen+Adam Lambert, the UFC, Rascal Flatts, and the Black Eyed Peas, among others. He's climbed steel upside-down and rightside-up, and still loves the view from the grid.