



"Flip day" for *King Baby* at IAG Shipyard in China, showing the largest composite deck structure ever fabricated in that country. The carbon fiber beams designed and engineered by Eric Greene and Associates can be clearly seen.



KEEPING THE PLATES SPINNING

Project management of the design and construction of a superyacht

BY TIM KINGS

We'll start things off here with a key assumption, which is that the yacht owner has his or her preliminary drawings and a signed contract, or at least a signed and funded letter of intent with a particular shipyard. This is the best time for a senior project manager to enter into the growing organization that it will take to effectively plan, manage, construct, and execute a new project of this scope. It is the well-prepared project manager who knows the project documents, the drawings, and the growing details of the specification, inside and out. Very few people will remember how a project got started, but everyone involved will remember how it finished, and it starts with planning well. The old adage—fail to plan, plan to fail—is as true today as it's ever been.

Also, it is important to note that the job of a project manager encompasses many facets. A project manager's job on a 480-ft. all aluminum super yacht, being built in a high-quality, properly staffed European yard, is a vastly different type of project management job than a 140-ft. composite super yacht, European designed, with high-end American products, being constructed in mainland China. The two types of job require differing strategies, differing mindsets, and differing focus on human communication details.

This article will focus on overseeing the construction of a 140-ft. composite yacht, *M/Y King Baby*, built in Zhuhai, China, at the IAG Shipyard. I have been a project manager for most of my career, either working directly for a shipyard, directly for a yacht owner, or as a liaison between the two as Tim Kings, Inc. Critical, strategic project management with a focus on human psychology is



Evan Marshall, the exterior and interior designer on the project, discusses design details with the owner and his team during a mock-up exercise on the interior of the yacht.

Captain Bryan Carter, left, gets a sense of things from the pilothouse during "decking down" of the upper deck. Off the captain's right shoulder can be seen the author's project manager office, built just astern of the vessel.



Eric Greene came over and worked both with the engineering department and the glass shop to oversee the execution of his carbon-designed hardtop structure and the mast.

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intense, and it directly impacts whether a project is completed on time and on budget. How to successfully manage a complex, sophisticated, customized superyacht for a client with exceedingly high standards in a Chinese environment, well...that book has not been written yet. It can only be lived. Anyone attempting this type of project has to comprehend the many facets of such a task, as I have learned to do.

If planning is king, then momentum is queen. Momentum is the positive result of planning well; it's intangible, but palpable and sometimes tingly when the project really gets rocking and rolling along, hitting the set milestones. Like the Aurora Borealis (which comes, shows itself, and then fades), momentum can be elusive, but it cannot be faked. Sometimes the yard will try to fake it with more labor or more hours spent in overtime, but there is no substitute for real shop momentum.

Focus and energy

Starting in April 2013, we worked as a team—together with the captain who was selected and hired by the owner, and the operations manager of the shipyard—and all of our initial focus and energy was directed at spooling up, obtaining, and then maintaining that elusive energy force, momentum. Right from day one, we established a realistic Chinese labor assignment schedule, sequencing the build strategy and detailing hours for all the labor, broken down into the tasks. All the while, our assembled team focused on engineering and getting the materials identified, purchased, and to the shop floor.

We established major incentives with quantifiable milestones for the labor, for erecting the large portions of the project. We maintained and redefined the milestones as the project progressed, always keeping the incentives clearly visible. We learned that we had to keep the carrot close in front, in focus and quite visible for all to see and comprehend. Workers knew they would receive a red envelope (a Chinese custom) for every milestone reached on time. Red envelopes are known to contain money; workers received a week's salary. It made a real impact and was a major ingredient for the momentum we were seeing on the shop floor.

In terms of managing the *King Baby* project, we really only had to do one thing correctly in order to have a successful, cost-effective build. To have both a satisfied client and a profitable builder, we had to make correct decisions, every day, every time, that were in the best interest of the yacht's quality, in the best interest of the build schedule, and in the best interest of the project budget. Making correct decisions each day is paramount. Because both right and wrong decisions always set off a wide-reaching cause and effect ripple, recognizing the impact before each decision is something on which the project manager in China must come to depend.

We had to establish a written build strategy/sequence, applying daily/weekly/monthly labor projections. We had to establish a system of managing, maintaining, and reacting to the momentum of labor. I called this "erecting the scoreboard." Because the largest single category on a build is the labor hour component, the monitoring, knowing, and affecting what the labor score is during the entire build is paramount to getting the project completed on time. This scoreboard was used to manage, adjust strategies, address material flow, and finally, to reward. It was a critical tool to acquire and use daily, revising often, informing the inquisitive owner. This became repetitious; we had to constantly work at it, practice it, and practice it more.

Material management

Just as important, and even more challenging, especially with the project being built on the other side of the world to an "American standard," was getting the materials identified, ordered, paid for, containerized, shipped, and cleared thru Chinese customs. Additionally, we had an extraordinarily inquisitive owner, who thrived on the whole construction process, with his own very unique project engineering challenges. It was somewhat like getting guns, rations, and ammunition to the front lines to successfully defend a stand. Making those correct and timely decisions, which impact both the labor and material sourcing, remained the central focus of our project management efforts.

There are many choices in terms of selecting support vendors, contractors, specific engineering resources, and parts suppliers, and



many pitfalls in getting the matrix correct. With *King Baby*, getting the most experienced suppliers was among the most cost-effective decisions we made. More important, when drawing on this experience for the correct decisions, is that we remained acutely aware of learning what NOT to do. Some choices that were centrally focused on the seemingly lowest cost generally ended up being the most expensive. And, conversely, the most expensive quotations for materials or services rarely ended up being what the project really needed.

It is the job of a project manager to carefully analyze candidate companies, understanding their strengths, weaknesses, and potential contributions to the project. The search for the right vendors and suppliers became much more of a priority for us in China, knowing this project needed experienced, engineering-driven companies, serving our shop floor as information givers.

For our project to have succeeded as it did, we had to partner with experienced companies. These included such companies as Nautical Structures for our davits and passerelle; Dometic Inc. for our complete HVAC systems; American Bow Thrusters for our 4-fin stabilizer system and bow thrusters; and Jastram Steering for our ship's controls. For maintaining proper controls over the ultimate displacement, trim, and balance, we had to employ high-tech resin-infused carbon fiber for our fly bridge deck structure, and the enormous hardtop and upper main mast. This specialized engineering was not in-house at the yard. These major components were the largest carbon fiber structure parts for any yacht ever built in China. For this, we needed the special expertise of Eric Greene and Associates.

A large, very heavy hot tub and waterfall was placed on an even larger unsupported fly-bridge (F/B) deck structure, which required a very close engineering study of what it would take to adequately support the deck structure over an equally large and expensive stainless steel (S/S) sliding door into the sky lounge. It was here that copious amounts of carbon fiber being added to the foam deck beam structure came to the rescue. In large part, once the decision for these

To ensure a higher degree of success, an expert on Mapress-fittings, the tools and techniques required, was brought to the yard to train the plumbing and piping department.

special players was made, I credit a very involved owner for listening to the counsel being given and allowing us to bring in the specialty engineering support of Eric Greene. This early decision had a knock-on effect, which paid further dividends solving another challenge. The finished product was the beneficiary, and this action of using carbon engineered structure contributed to the seakeeping good manners of this yacht while at sea by reducing the center of gravity of the vessel. This was engineering that you could, in fact, feel, as it had direct impact to the meta-centric heights and balance of the vessel.

Some of the owner's design challenges required creative, non-off-the-shelf engineering solutions. We had a very large unsupported composite deck with the sky lounge area. In that space, there was a large marble-clad bar with marble floor. This presented an engineering challenge: how to diminish the slight "bounce" we could feel when walking thru this area. The solution came from designing what was basically a suspension bridge tie-rod between the carbon structure of the F/B described earlier, and an S/S saddle bracket mounted under the sky lounge deck connected via a T-30 sailboat tie-rod and turnbuckle. These solutions take creative, outside-the-box thinking. In building a custom yacht such as *King Baby*, a project manager and his team have to solve a multitude of never-been-solved-before problems, and that takes creative design and engineering.

Whereas the engineering of any large yacht project is more of a science, a known science of calculations, with many predictable formulas for guiding and projecting a successful outcome, project managing is truly more of an art form. It requires the ability to thoughtfully finesse, harness, and guide the unpredictability from a multitude of human factors involved, especially in China.

The right people

Establishing and then filling out the organizational chart in terms of getting the right people onboard the team; keeping the wrong people from boarding the project; and then making sure you are dealing with a well-informed client: these are at the heart of a project, keeping the owner fully informed enough to give him a sense of the pulse from the project. It takes a special sensitivity to the individuals involved, as spokes on the wheel of progress. Project management is best organized with a special teams approach, with the project manager being the head coach, and the team owner being the yacht owner. For a project being built on the other side of the world, we found it beneficial to provide constant project updates, with a lot of photographs, to the owner in order to keep him involved. In a sense, we were like a probe on Mars, sending back intelligent information on the status of the momentum for the owner participating in the decision-making process. This owner wanted to be actively involved in many of the critical decisions, which had a direct impact on the momentum.

A project manager must be a mile wide and an inch deep as he assembles the team of required characters. This is where the seed of a great project gets planted. The project manager searches out and

The large main deck component has just been removed from the mold and is "flipped" outside. This was only part of the entire main deck, and this too was the largest-to-date composite deck structure built in China.

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This is the lower stainless steel saddle used as part of the suspension bridge solution to the sky lounge problem. The saddle is mounted fore and aft, with the end plates tapped into alum plates that were G-flexed to the carbon beams.

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The upper saddle was attached in the same manner to the fly-bridge deck carbon beams. The tie-rod is a Navtec T-30 sailboat rigging.

Having just completed sea trials, *King Baby* is shown underway on the owner's first trip to St. Martin's. Photo by Quin Bisset.



assigns the roles in a variety of categories, starting with the design and engineering. These are critical categories that must be filled out with people experienced in design work and electrical-mechanical-systems engineering, along with the required composite/ structural engineering. Experts in each category were carefully searched out, vetted, and woven into the team's fabric. Flowing from those critical information sources would come much of the material call-outs, then the sequencing of a schedule for the deliveries of all the tasks. This search and accumulation of the specialty team, to augment the shipyard, became the hallmark and the reason for the success the project enjoyed.

Starting with the design, which is normally directed and dictated by the project client: it is important that his voice is heard and comprehended, and that he gets experienced feedback during this process. There are many situations in which the owner could have led the design into unsuitability because of his lack of knowledge of the impact of his requests. For example: an owner may want to have programmable lighting throughout the interior. An owner may not know the amount of interior space required for the lighting control sub-panel boxes, which are found in the interior spaces, inside the furniture. Large, easily accessible spaces must be allocated within the furniture design for three or four electrical control panels. It is this type of critical and timely input for which the project manager must have the inch-deep, mile-wide view of the team's work output.

Design loop intersections

We found that recognizing the many design loop intersections played a major role in keeping ahead of problems still to come. A case in point is that, while the HVAC system was being designed, sized, and engineered at Dometic, so too was the very complex TV/

stereo sound system over at Palladium Technology. An example of a design intersection was the need to air condition and ventilate the hot spaces being produced by the amplifiers and CPUs. Project management had to catch that particular, very important issue in our regular design review meetings, as either one of these companies may not have caught that or known that while producing their individual engineering work.

With this kind of project being built to class, outfitting the interior design to accommodate the required fire extinguishers, life-jackets, medical boxes, fresh air make-up units, dual escape routes, and so forth will all play a role and have a significant impact on the design of the interior. Catching these varied points at the right time is critical if the project is to remain on schedule and on budget. Addressing all of these issues has a direct impact on the workability/livability of the interior. If it is not thoughtfully designed from the very beginning, addressing each aspect of these items, it will set off a domino effect, which ultimately must be addressed and will be felt further down the line. At this point in the project, the quality of all the millions of decisions to be made along the route to completion will soon be felt by the owner and his guests when starting to live and relax in these spaces.

This is why all of the critical engineering talents mentioned earlier must be involved early in the design phase. Engineering expertise is at the foundation of a great yacht building project. To neglect this aspect of project management involvement would have been to invite chaos and disaster to the interior design and livability. The structural engineering, in all its facets, had defined the internal envelope, inside of which the interior furniture and critical systems had to fit and reside, both in harmony and serviceability.

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TOP: The large unobstructed view of the main deck saloon looks forward toward the dining room. Note the rock & roll music motif of the interior. Photo by Quin Bisset.

MIDDLE: Looking aft in the galley of *King Baby*. The great functioning galley layout is the result of many trips back and forth to the mockup by the owner and revisits to the design board by designer Evan Marshall.

BOTTOM: With five deck areas of teak planking, it was a great opportunity to design a unique pattern, full of details. The *King Baby* logo was carefully designed and executed into the forward seating area teak decking, which accentuated a lovely spot for taking in the view. Photo by Quin Bisset.

These areas of net space are critical to establish, for much of the electrical, mechanical, and systems reside in this zone. All the miles of wire bundles, cable trays, plumbing, piping, and ventilation ductwork must live in choreographed harmony within this net space. An experienced project manager must aggressively focus the assembled talents to define, resolve, and organize this harmony before the interior furniture can be detailed, sized, engineered, and executed. Many times, this type of specialty expertise does not reside at the yard. In our case, it was obvious early on that we had to recognize that and aggressively take corrective action to augment those shortcomings in talent.

Spinning plates

King Baby launched in August 2015, and looking back on it now, I see how project managing this type of complex build, never having been undertaken nor completely executed in China before, had to take a wide-angle view. We had to focus on myriad subject matter with a very centrally focused view to getting to a successful launch and sea trial. It reminds me of an act that aired on the Ed Sullivan television show in 1964, just before the Beatles' first U.S. appearance. It was a guy spinning rare, expensive Ming Dynasty dinner plates, on top of stationary sticks placed on the stage, adding more and more plates as he spun each and every one. This guy got up to about 30 plates, without breaking a single one.

Every decision a project manager makes is an expensive one. Every detail is an important one. This project manager had to stretch to his limits without dropping a single detail. Plan well and finish well. **MT**

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