LISTENING TO:

ENGINEERS

IN THEIR STRUGGLE FOR RESPECT, THEY ARE OFTEN
PITTED AGAINST OR ALLIED WITH ARCHITECTS.

by Barbara A. Nadel, AIA

This summer, RECORD's editor in chief, Robert Ivy, FAIA, convened a panel of 10 prominent engineers to explore how market-driven changes are affecting architecture and engineering. When the three-hour session was over, the participants had shed light, heat, and form on everything from contractual relationships to mutual respect. While the fundamental differences in the way architects and engineers view their work are explicit, it is also clear that the two professions must focus on common goals—if only to protect themselves from those seeking to usurp project management responsibilities.

The engineering firms represented are large, but the discussions covered issues equally relevant to smaller companies. Mechanical/electrical engineers included John Hennessy, PE, chairman and CEO of Syska & Hennessy, a 475-person New York City mechanical/electrical engineering firm with nine offices; George P. Karidis, PE, vice president of SHG Inc. in Detroit, a 340-person architectural/engineering firm with eight American and two Asian offices; Norman D. Kurtz, PE, principal, Flack & Kurtz Consulting Engineers, a 275-person New York City mechanical/electrical firm with two American and three international offices; and Marvin A. Mass, PE, a partner at Cosentini Associates LLP Consulting Engineers in New York City, a 400-person firm with five American offices and 20 European affiliates.

Structural engineers included Kimberli J. Beasley, PE, a senior consultant with Wiss, Janney, Elstner Associates Inc. in Princeton, New Jersey, a 13-office, 250-person firm specializing in investigative engineering and remedial design; Jon D. Magnusson, PE, chairman and CEO of Skilling Ward Magnusson Barkshire Consulting Structural and Civil Engineers, a 120-person Seattle firm; Frouma Narvy, PE, principal, Urbitran Associates, a 165-person New York City structural, civil, and transportation engineering firm with offices in the United States and Israel; Guy J. P. Nordenson, principal, Guy Nordenson and Associates, a New York City structural engineering firm, and associate professor of the School of Architecture at Princeton University; Leslie E. Robertson, PE, director of design for Leslie E. Robertson Associates and Consulting Structural Engineers, a 50-person New York City firm; and Richard L. Tomasetti, PE, principal, Thornton-Tomasetti Engineers, a 350-person New York City firm with six American offices.

Barbara A. Nadel, AIA, is principal of Barbara Nadel Architect in New York City, specializing in health, criminal justice, and institutional planning and design.
By now, architects and engineers recognize that good personal and business relationships among all construction team members are the foundation of a successful project. But creating that relationship—through contractual arrangements, team leadership, communication, and mutual respect—is not so easy. That’s especially true in light of the increasing emphasis on technology, greater competition, and new business relationships that are evolving as a result of current market conditions. How will design professionals work together in the future? What changes do engineers seek from architects? Are design professionals maximizing opportunities for collaboration?

Forty years ago, architects and owners got together and hired the engineers once the design process was under way. But over the past two decades, as various contractual arrangements, including design-build, have developed, the leadership scenario has changed. Engineers now have an even greater stake in the success, profitability, and risk of a project. As a result, engineers also want to be called in at the start of the design process so they can understand and contribute to project goals and budgets.

Too often engineers are treated as a commodity, said Norman D. Kurtz. It is up to architects to encourage owners and project managers to base their decision of which engineers to hire for a project on professional abilities and the quality of the relationship, rather than on the lowest fee. “We should be collaborators helping architects, and ultimately owners, achieve their goals professionally and commercially, not subcontractors to be bought and sold for convenience,” he said. Strong words, but other panelists agreed that these days price, more than any other ingredient, seems to determine who gets hired.

Part of the problem may be that engineers, unlike architects, have no single trade organization looking out for their interests. Engineering professional societies are numerous and fragmented, representing a multitude of disciplines and special interests. This lack of a single, strong voice has not helped those in the building trades to achieve greater respect from the public and other professionals.

“We should stop talking to ourselves and start communicating with architects, lobbying for the same things [they get], and addressing the public about our skills. That’s the key to getting ourselves recognized and making a difference” in the way we are perceived, said Frouma Narov.

Engineers are not perceived as important people in America, though they are highly regarded in other countries, Marvin A. Mass said.
"Most of us wouldn’t dream of hiring the people the managers bring to meetings, yet it is they who orchestrate the process,” Kurtz said. “First they separate the team, interview the architects, beat them up on fees, and then do the same to the engineers. We all march to it. These people charge the owner a substantial fee and justify it by lowering our fees. Projects suffer because the project manager becomes the intermediary between the client and the design professionals, filtering advice, communication, and technical knowledge. These people are unnecessary and don’t help the process.”

How did this change in leadership happen? According to Narov, architects and engineers are both at fault. “We should have had more businesslike,” she said. “During the 1970s, when construction management emerged, contractors jumped in and architects and engineers relinquished that part of the business. We’re doing the same thing now with design-build.”

Increasingly, George P. Karidis said, “consultants like Arthur Andersen & Company want to manage all client needs, treating architecture and engineering as sidelines. We bring leadership and sympathy to projects,” but have not been proactive about promoting these skills.

“The pride and satisfaction of doing a terrific job overshadows everything else for the engineer; that’s part of our problem. That’s why we take second place and why the Arthur Andersens become the consultants to owners,” Narov said. “These people have no technical ability, no knowledge of owner needs, but they know the importance of a leadership role. They go out and get an engineer—who works in the back room—while they have the glory and the limelight,” Narov said.

Added Tomasetti: “We can blame the attorneys,” who may have advised design professionals to go along with the owner’s demands so they could keep the work. “But we’re the ones who listened to them.”

James E. Frankel, an attorney for several of the panelists and chairman of the Construction Industry Practice Group at the law firm of Baer Marks & Upham, was interviewed on this subject after the panel discussion. He agreed that members of the design community are not paid properly for the services they provide, but he pins blame on the shifting demands of the market. “In a competitive market, roles change and fees are whittled down. The design community’s abdication of leadership roles corresponds to owner demands for reduced design fees. As a result, the design community reduced its scope of work,” Frankel said.

Last May, the Economist reported in its piece “Engineering: In Need of Heroes” that the public cannot name any famous engineers, while many architects, such as Frank Lloyd Wright and Richard Meier, are household names.

“We’re intimidating, mysterious to architects, and definitely not kindred spirits. We don’t have any stature in the architectural community,” Mass added. That is particularly true of mechanical engineers, who have less stature than structural engineers, whose work is more comprehensible to architects and the public in general.

However, as Richard L. Tomasetti pointed out, “Respect cannot be demanded, but must be commanded and earned. If engineers are not getting respect, we must ask ourselves why.”

**New relationships**

Perhaps the biggest change in working relationships within the design and construction field has been the emergence of the project manager as team leader, a role held in the past by architects. The resulting erosion of the architect’s role has had repercussions for engineers.
In the design-build process, the biggest risk comes at the front of the project, when the teams are assembled and pricing is assessed, based on the design. "How often do we get a fee for our design work? We don’t get a piece of the action even when we collaborate with the contractor," Narov said. "We want to share in the profits—more than just 25 cents per square foot for the design."

Charging hourly fees instead of getting paid on the basis of value added to a project limits compensation. "Profitable law firms don’t succeed by charging $500 an hour but by taking a percentage of the deal regardless of how many hours they put in," John Hennessy said.

Another alternative is to have design team members receive share of the profits once the building is sold, Nordenson suggested. If a owner sells a commercial building for twice the construction cost three years after it is completed, for instance, designers should get a proportionate percentage of the profits. This scenario could occur only if everyone involved agreed in advance, Hennessy said. But the prospect of greater profits would go a long way in motivating the individuals involved in the project.

**Design-build**

The second major change in the way business is done has been the advent of design-build, which is the fastest-growing method of project delivery, according to the Building Futures Council. Though engineers and architects are becoming increasingly savvy in these relationships, design-build has greatly altered how the leadership roles are structured. "Design-build doesn’t mean the designer is out of the picture," Narov contended, "but there should be a way for the designer to assume a place in the process."

The panelists discussed numerous design-build arrangements. One common approach is when a team of architects, engineers, and contractors is assembled, perhaps for a competition, and bids on a project. Another approach is when an owner selects an A/E team, which, in turn, develops a building program, preliminary design, and rough cost estimate. This package may go to the selected design-builder or out for competitive bidding among several design-build teams. Generally the design-builder will also have its own A/E team, whether in-house or as consultants by contractual arrangement. Owners may also want their original A/E team to be available to ensure that the intent of the initial design concept is carried out.

As traditional contracting methods change, engineers want a bigger share of the profits, a more prominent role, and greater responsibility for the overall project. Narov claimed that her most successful design-build projects have been those in which she invested money and became personally involved. She urged architects and engineers to take more risks and demand project equity. Sharing in the profits of an ongoing commercial project could include management and leasing roles, since developers routinely pay leasing agents a percentage of money they bring in.

**Contractual relationships**

Changing leadership roles have an impact on contractual relationships as well. "Engineers must know who holds the contract," Narov said, referring to the often confusing contractual relationships among members of the design and construction team. The engineer may be working for the owner, the architect, the construction manager, a design-build entity, or other individuals or companies. That relationship drives how work is done and who leads the project. And leadership styles must fit the needs of the project. For example, a laboratory may need more coordination than projects where client management takes precedence.

On large, sophisticated projects, consultants often cannot do preliminary work because funding is not available until the design-build contract is signed. That slows work progress. Public projects pose more difficulties, because, panelists agreed, most federal agencies prefer A/E firms over independent consultants. Agencies want a single point of contact an successful project-delivery track record. "People don’t build buildings to keep us employed. They want a less cumbersome process," Hennessy said.

The contractual relationship affects communication channels at
Forensic specialist Kimball J. Beasley troubleshoots conflicts resulting from poor communication among owners, engineers, and architects. "Owners don't understand complex technology—cladding and wall systems, waterproofing techniques, routine maintenance needs," he said. "Lack of information and overlapping responsibilities contribute to problems." The result is uninformed clients and a frustrated design team.

By comparison, Jon D. Magnusson cited a project in which the owner contracted directly with him, the architect, and other major consulting entities as full partners. As a result, Magnusson was at the table when key decisions were made about whether to use concrete or steel, for example, or what type of roof would hold up best. As a result, decisions were based on project needs, not just design goals or money concerns.

Engineers have another practical reason for wanting to contract directly with owners: they get paid faster. "Architects think of the engineers as a bank; they'll hold our money for 30 to 90 days. Mechanical engineers are the lowest guys on the food chain," Kurtz said.

Hennessy agreed: "I'd love to have contracts with the owner. That way, I avoid problems if the owner is mad at the architect for whatever reason. I've seen the architect simply add three floors to a project without asking for any additional fee just to smooth over the relationship." Engineers, understandably, don't want to pay for the blunders of other members of a team. "Clients have become pretty savvy," he added. "All they have to do is yell at the architect and they get something free," though often at the expense of others on the project.

**Business management**

Despite the strong economy, bigger workloads have not necessarily translated to higher fees and greater profits. Salaries are rising fast, as are expenditures, particularly on computer technology. The disparity of low fees in an active marketplace is even more pronounced for public sector clients, especially those relying on fee schedules developed during the 1980s, when work was scarce and clients negotiated fees below published schedules.

Computer technology is also affecting how engineering businesses are managed. Electronic capabilities are creating greater expectations among clients, requiring architects and engineers to produce more detailed drawings than ever before and to be more thorough. Schematics contain much more analysis than they did 20 years ago, panelists agreed.

However, communication is much improved among all team members. "We E-mail drawings to Shanghai, and our answer is there the next morning," Kurtz added. But the price, in terms of investment in workstations, software, and field communication, is substantial. Faster output on tight deadlines may meet client expectations, but hastily prepared documents and specifications often miss critical details, Beasley observed. Employees no longer have time to sit, hold a pencil over a document and think. "Design work requires time, and that's being compressed," he said.

Lawsuits occur as a result of missing or improperly detailed connections, incorrect product specifications, and a lack of familiarity with project specifications—all because work is being done too quickly. Complex, computer-generated documents can confuse contractors, causing more problems. "There's no time to think," Kurtz lamented. "You get the drawings, and 24 hours later they want the answer."

**Going global**

Almost all of the panelists have maintained some international presence for the past 20 years. Client globalization—through corporate mergers, consolidations, and business expansion—has resulted in more international work, even for mid-sized firms, Karidis noted. For example, one of his firm's domestic clients is Chrysler, which is now German-based.
Daimler-Chrysler. Servicing existing clients with expanding domestic and international needs prompted the Smith Group (parent company of Karidis’s SHG) to establish offices in Malaysia and Manila.

“The boom came when the American market contracted between 1991 and 1992,” Kurtz said. “The ‘rock star’ architects and engineers parachuted into Asia for the same reason: we knew how to do high-rise buildings and that’s what the Asians wanted [before the economic crisis]. Since then, international work has increased all over.”

Some of the panelists fear that American engineers are making themselves obsolete by sharing their expertise with other countries. “We’ve taught engineers in Europe, Japan, and Jakarta and now they do their projects themselves, without us,” Mass said. However, Asians and others have much to learn from American management and communication systems, he added.

A/E firms vs. engineering consultants

What are the benefits of working with multidisciplinary engineers in one shop versus an A/E team in a single office? Karidis, the only engineer representing an A/E firm, said that clients seek synergy in consulting teams. Team organization rewards and shapes behavior. “If you have common interests without competing financial obligations on the same team, you’re aligned,” he explained. Communication is the main advantage because team members already know each other. “Engineers can study fenestration, overhangs, and building massing while architects can work with engineering issues that might otherwise get dropped if they were just an appliqué to the overall design. Without synergy, design decisions miss important technical issues.”

Multidisciplinary firms rarely produce design excellence within all divisions, prompting savvy owners to “cherry-pick” the strongest departments from among several engineering firms for a project. Excellence is not consistently found in one firm because people who excel at their trade often leave to start their own shops and be their own boss, Hennessy said. “Architects and engineers are fiercely independent. Finding design excellence—in architectural and all engineering disciplines—in one firm is unimaginable.”

Yet A/E firms are not precluded from hiring top talent and offering excellence in different areas. “A/E’s are well suited for large, complex projects requiring good coordination, such as research labs, where integration is the heart of the problem,” Karidis emphasized. Decisions to hire an A/E firm, rather than several consultants, often depend on the project, the region, and the client.

What’s ahead

Engineers and architects face important technology issues in the next decade. Indoor air quality, which is affected by everything from exterior wall systems to finish materials, is a growing concern. Seismic and wind design technology will continue to be an issue, as will energy conservation and sustainability. More research in areas of mechanical engineering is needed, Mass said. “Cooling towers are the same as they were 50 years ago,” he explained. Panelists agreed that there is too little research on innovation.

On the business front, compatible software platforms facilitating greater communication and coordinated drawings would benefit architects and engineers. Design-build will continue to grow and be refined, though many of these relationships are likely to be defined in court rather than in the field.

But most important, architects and engineers must remain united against external pressures applied to the design field. “We must look to each other for broad design and business solutions, rather than limit our relationship to how buildings work,” Robertson said. Narov agreed and urged architects and engineers to become politically active. “We can accomplish more by working together, identifying causes and candidates that will give us a better profession and a better quality of life.”

Jon Magnusson (above) said engineers are motivated to do better work when architects show an interest in technology and provide drawings with technical details.