

Integrated Consultants:

The expertise you need to solve your toughest process engineering challenges

Adapting your process to new manufacturing techniques, or changing federal standards. Maintaining and improving manufacturing quality. Keeping operations running smoothly. The challenges are constant.

And no matter how astute your process engineering staff may be, the time will come when you're confronted with a problem that you're simply not comfortable tackling on your own. When you need the help of outside engineering talent.

Integrated Consultants is a professional engineering consulting firm, serving mechanical and industrial engineering departments of commercial and military organizations across the United States. Our clients range from large multinational companies and government agencies, to single-site manufacturing businesses. While typical assignments involve process engineering or electromechanical design, we're often called in to provide expert testimony, or interpretation of federal standards, such as ASME, EPA and OSHA.

And while technical expertise is our business, our greatest skill may be the ability to communicate complicated ideas and information in a straightforward, easily understood way. So, whether communicating with plant engineers or manufacturing personnel, the important information is crystal clear, and has a lasting impact.

Trust Integrated Consultants to help bring intelligence to your next engineering challenge. We'll put together a team that will deliver the results you need.

AREAS OF EXPERTISE

**Electromechanical Device
and Process Design**

Electronic Fabrication

Facilities Engineering

**Waste Water,
Waste Gas Treatment,
and Delivery Systems**

Specialty Acoustic Systems

**Aquisition Liaison for Military
and Federal Procurement**

**Commercial Freezer
Construction and Renovation**

Forensic Investigations

**Interpretation of Federal
and Commercial Standards**

How do you fit a 30-foot heat exchanger into a 20-foot room?

The manager of the world-renowned particle accelerator facility had a problem.

The physical size of the heat exchangers used to super-cool the particle accelerator had become insufficient for the process. More advanced heat exchangers were commercially available — yet they simply could not fit into the facility.

Now he was faced with a difficult decision: should he build a new facility for the super-cooling process engine? Or, was there a better installation alternative?

Integrated Consultants was asked to analyze the problem. After our analysis, the most viable and cost-effective alternative topped the list: we proposed adjustments which allowed the current facility to house the larger commercially-available heat exchanger. Then, we supervised the installation process, which involved removing and then reattaching the top of the building, to permit the huge device to be lowered into place.

The facility's **problem was solved** at a fraction of the cost they anticipated.

Integrated Consultants first **identified and resolved immediate mechanical and control issues**, and worked with our staff to recognize operating nuances so as to maintain consistent quality. Then, over the next several months, they **designed and fabricated** our next generation vulcanizer, incorporating **innovative structural adjustments** that were not previously available. The new machine has been reliable and is operator-and maintenance-friendly. Through these and other projects, **Integrated has offered technical and hands-on experience** that permeated our shop operations. / MECTROL CORPORATION

The good news:

We won the contract!

The bad news:

It's gonna kill us!

The president of the fabrication company was thrilled: he had just landed a contract with IBM, to produce high-performance motherboards. But then, reality sunk in.

The contract required gold-plating the entire outer layer by immersion in a solution of ionized gold. Now, as the company worked out the specifics of the production process, they realized that they had made a critical miscalculation: while they had accurately figured the cost of gold per board, they had overlooked the fact that simply filling the immersion tank with the gold solution would cost some \$50-60,000. And that unforeseen cost was more than the profit on the entire contract.

They turned to Integrated Consultants. Our first line of attack was to reduce the volume — and therefore the cost — of solution needed. To accomplish this, a custom immersion tank was designed, which allowed them to apply the gold plating with the required accuracy, but at a fraction of the cost. Then, other aspects of the fabrication process were enhanced, which involved both machine design and surface-mount technology, to provide a better, more consistent end product, at lower production cost.

The conclusion? The fabricator **earned a better profit** on the contract than originally planned — and IBM became a satisfied, repeat customer.

Due to superior quality requirements, we have gone beyond the design and engineering phase of supply. Inevitably, fabrication technique and quality assessment issues arose. The personnel of Integrated Consultants were **able to identify producibility issues** and **proposed techniques** to enhance the product fabrication cycle. Their **ability to assess decisions** based on resource requirements **reinforced our business plan** and ultimately **helped drive revenue**— solidifying our position as an innovative supplier of electronic apparatus. / **REAL TIME DEVICES**

Even the military and U.S. government need help sometimes.

The call came from a manager within the Department of Energy. He was beside himself with frustration: one thousand units of a product had been built for him by contractors, adhering to strict standards. Half of the units were failing randomly while in storage. He needed Integrated Consultants to determine and rectify the problem.

We began by reviewing the product specifications, and then visiting the various suppliers in the production chain—material producers, material processors and component fabricators—each of whom were eager to suggest that the fault lay with someone else. Yet, after just a brief review, we were able to isolate the cause of the failure, and consistently reproduce it.

The fault lay with the production specifications: as part of the fabrication process, a spool of stainless was being re-rolled to reduce its thickness, then wound onto the spool. However, as it was re-rolled, the inner most section of the spool was retaining excessive heat; this caused carbon to migrate out, reducing the quality of the steel and causing failures. We recommended an alternative manufacturing treatment which would eliminate the problem.

Integrated Consultants worked repeatedly with government and military organizations, **providing expert assistance** and prompt, cost-effective solutions.

The staff of Integrated Consultants brought **practical solutions** to each project assigned to the group. I was **comfortable with the approach and progress** offered to the laboratory, and had no problem assigning outwardly difficult tasks that required involvement with multiple vendors in several states. / **FERMI LAB**

This ASME regulation means I'm facing almost \$1 million in testing expenses — Or, am I?

Understanding and complying with EPA, ASME and OSHA regulations can be difficult and costly. Yet, because of the safety requirements and severe fines at stake, fabrication companies are wise to fully apply these standards and requirements.

For the nuclear facility, performing an ASME-mandated hydrostatic pressure test on the welds of an in-service process vessel looked to be a nightmare. The vessel was suspended some 65 feet in the air, with three input nozzles and three output nozzles that would have to be removed and capped in order to perform the test — then welded back in place. Cumbersome and time-consuming, the test would also be costly, estimated at almost \$1 million.

The facility retained Integrated Consultants to perform the required ASME certification of the vessel. Our analysis showed that the pressure test as mandated had inherent problems in this particular case: the welds required to reinstall the three nozzles after the tests were longer than the welds that were to be tested within the vessel itself. Thus, performing the test actually increased the risk of problems.

Integrated Consultants devised an alternative method for testing the welds, using x-rays and magna flux, and advocated this alternative testing approach with the ASME review board in New York, **winning approval**. As a result, the vessel required no disassembly and rewelding: The nuclear facility had the vessel back in service in a fraction of the time, at about one-quarter of the cost.

Dave Aberizk from Integrated Consultants was a **can-do guy** to the moisture separator reheater group. **Resolving obstacles** eliminated the phrase, "its not possible" from his vocabulary. **Attitude and ability helped** resolve many difficult issues. / **GENERAL ELECTRIC**

A search for the truth: the workplace injury

Raymond Arnold went to work that morning not knowing that his life would be changed forever. Just before lunchtime, an industrial accident on a high-speed fabrication machine would cost him the use of his right hand.

Inevitably, the question arose: Who was at fault? Was it the manufacturer of the fabrication device Raymond was using? There was no guard or safety switch on the machine — perhaps there should have been.

Was it the employer's fault, for not training the machine operators about safe operating practices? Yet, the machine had a number of operators, and thus far none had been injured by this machine.

Or, was it Raymond's own fault? Had he cut corners, failed to follow standard safety procedures as instructed?

Integrated Consultants was asked to provide an impartial opinion. We performed an exhaustive series of interviews, with Raymond and other operators of the machine, as well as Raymond's supervisor and representatives of the company who designed and marketed the machine. We analyzed the performance of the machine, and alternative design and safety approaches.

Our opinion was that the machine designers had failed to anticipate the inherent risks of operating their machine. The expert testimony provided by **Integrated Consultants was instrumental** in the worker's case. The judgment was in favor of Raymond Arnold.

Integrated Consultants has **investigated accident scenes**, and conducted interviews with victims, witnesses and employers. Their research has required obtaining positions from specific professional societies and federal agencies, so as to arrive at an **impartial conclusion based on forensic evidence**, physical principles, and accepted engineering standards. I have been comfortable with their conclusions, and have **successfully litigated** those where the technical evidence supports further legal action. / **PETER SOLOMON, ESQ.**

How we work together

Integrated Consultants has worked with many of the best-known organizations and businesses across the nation. Each of these engagements has added to our capabilities, giving Integrated Consultants a broad range of professional expertise. In addition, experts in specialty areas are retained as members of the project team for problems of an extremely unique nature.

The chart to the right details the process of how we might work together.



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IDENTIFICATION

Defining both the scope of the problem, and client expectations for the outcome.

ANALYSIS

Looking beyond the obvious causes, to discover the true nature of the problem.

APPROACH

Developing a solution that both deals with the true source of the problem, while also meeting the clients requirements.

EXECUTION

Implementing the solution, often by means of a project team.

KNOWLEDGE TRANSFER

Educating the client's engineering or manufacturing staff as needed for long-term success.

REVIEW

Revisiting the solution after it has been integrated into the client's process to ensure optimal performance.