



**The ChemQuest Group, Inc.** \_\_\_\_\_

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## **ADHESIVE FASTENING TECHNIQUES FOCUS GROUPS**

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**EXCERPT of Full Report  
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# EXECUTIVE SUMMARY

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## BACKGROUND

The main purpose of this qualitative research was to gain insight to the decision process in selecting fastening methods. This research is in support of the Building the Industry (BTI) initiative sponsored by the Adhesive and Sealant Council (ASC) to penetrate the mechanical fastener market using structural adhesives.

Seven in-person focus groups (six among Engineers and one among Architects and Builders) were conducted in four cities across the country (Philadelphia, Detroit, Chicago, and Phoenix) in May and June 2003.

One telephone focus group was conducted among academic professors in July 2003.

## SUMMARY OF FINDINGS – Engineers and Architects/Builders (in-person focus groups)

### Fastening in General

First, the participants were asked to think about fastening techniques they use in their particular business.

- As expected, they mentioned an extensive list of fastening techniques. Those mentioned most frequently included screws, nuts & bolts, rivets, adhesives, welding and soldering.
- In addition, participants mentioned using fasteners in many different ways and on various types of materials such as fabricated metals, electrical components, automobiles and in construction.
- When asked about sealants, participants indicated that they are generally used to seal out moisture. However, there were co-functional sealants mentioned which also have adhesion characteristics.
- Although most of the participants consider welding, to be a form of fastening techniques, it is viewed differently because the resultant bond forms one integral material.

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- According to participants, there are a variety of methods and sources available for learning about different fastening techniques. Some of the more frequently mentioned sources included trade publications, on the job training, suppliers, vendors and co-workers.
  - ◆ Formal education was found to play a very minimal role in teaching them about fastening techniques.
- The participants indicated that there are standards in place for the performance of fastening techniques. Some organizations mentioned most frequently as being responsible for these standards included SAE, ASME and ANSI.
  - ◆ Responses as to how these standards are developed varied somewhat from one group to another. Some believe that they are created by experts or committees, while others feel they are set by the industry out of necessity. In addition, the government (e.g. mil spec) and customers were said to often set standards as well.

## Decision-Making Process

Next, the participants were asked to focus on the process they go through in determining which types of fastening techniques to use for a given application. The factors that were mentioned most often as playing an important role in the decision process included:

- Performance / Durability / Quality
- Cost (raw materials, labor, tooling)
- Productivity
- Serviceability
- Availability
- Functionality
- Strength

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When asked to think about the key steps involved in the overall decision-making process, there was a diversity of answers given by the participants (particularly due to the various industries represented, products being manufactured, and materials being used).

- A general model that was formed describes the process as follows:
  - ◆ Identify materials, function, environment, end-use
  - ◆ Consider the various properties of fasteners
  - ◆ Define the manufacturing process
  - ◆ Evaluate the overall process
- Those generally involved in the decision process included engineers, manufacturing, purchasing, customers, salespeople, marketing and production managers.
- Participants categorized adhesives and mechanical fasteners very differently. Adhesives are often viewed as being permanent, messy, aesthetically pleasing, easy to use, having a questionable bond, specialized and not standardized.
  - ◆ Many of the participants indicated that there exists a perception that mechanical fasteners are stronger and more reliable compared to adhesive bonds.

## **Unmet Needs**

Next, the participants were asked to think about their products and industries and how the use or types of fasteners are changing.

- According to participants, changes included an increased usage of adhesives, miniaturization, weight reduction, environmental and safety concerns, increased productivity, and component reduction.
- Possible unmet needs that the participants were asked about included recycling, the assembly/ process, changes in substrates, and performance. There was some indication that these factors will also have an impact on fasteners and how they are used in the future.

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## Mechanical vs. Adhesive Fasteners

### Advantages and Disadvantages

Next, the participants were given a handout sheet (see Technical Appendix document) containing a list of design factors that could be considered when selecting a fastening technique. For each factor, they were asked to specify whether they feel it is an advantage or disadvantage for both adhesive and mechanical fasteners.

- Overall, the factors that most participants found to be advantages of adhesives included *weight, number of components (SKUs) in assembly, aesthetics, electrical insulation properties, noise/vibration dampening, thermal insulation properties, and corrosion resistance.*
- Factors that most participants found to be disadvantages of adhesives included *repairability/serviceability, low odor in manufacturing and end-use, manufacturing-employee safety and health, post-consumer recycleability, and ability to reposition during manufacturing.*

In addition, they were asked to circle the top three advantages and disadvantages for both adhesives and mechanical fasteners.

- The factors selected most often as a *Top-3 Advantage* for adhesives are:
  - ◆ Aesthetics
  - ◆ Installed cost
  - ◆ Weight
  - ◆ Number of manufacturing steps
- The factors selected most often as a *Top-3 Disadvantage* for adhesives are:
  - ◆ Repairability/Serviceability
  - ◆ Ability to reposition during manufacturing
  - ◆ Reliability
  - ◆ Low odor in manufacturing and end-use