Training courses in adhesive bonding technology

Passing on research directly to users – Technology transfer via knowledge

Fraunhofer Institute for Production Technology
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Fraunhofer-Gesellschaft (FhG)
Research partner for industry

The Fraunhofer-Gesellschaft is the leading organization for institutes of applied research in Europe. At present, the Fraunhofer-Gesellschaft maintains some 80 research units, including 57 Fraunhofer Institutes, at over 40 different locations in Germany. The majority of the roughly 12,700 staff are qualified scientists and engineers, who work with an annual research budget of over 1 billion euros. Of this sum, more than 900 million is generated through contract research. Roughly two thirds of the Fraunhofer-Gesellschaft’s contract research revenue is derived from contracts with industry and from publicly financed research projects. The remaining one third is contributed by the German federal and Länder governments, partly as a means of enabling the institutes to pursue more fundamental research in areas that are likely to become relevant to industry and society in five or ten years’ time.

IFAM
Expertise and know-how
– Adhesive Bonding Technology and Surfaces –

The Department of Adhesive Bonding Technology and Surfaces of the Fraunhofer-Institute for Manufacturing Technology and Applied Materials Research is the largest independent research group in Europe working in the area of industrial bonding technology. Over 120 employees are actively engaged in applied R&D work in adhesive bonding technology and surface technology. The scope of the work extends from fundamental research right through to production and market introduction of new products. The industrial application fields are chiefly vehicle manufacture and mechanical engineering, energy technology (principally wind and solar energy), micro-production and the packaging and electrical industries.

The Adhesive Bonding Technology business field is concerned with the development and characterization of adhesives, the optimized design and simulation of bonded and hybrid joints and their testing and qualification. The planning and automation of adhesive bonding at an industrial scale are also carried out. Further areas of work are process reviews and the provision of certified training courses in adhesive bonding technology.

The Surfaces business field is split into the work groups Plasma Technology and Paint/Lacquer Technology. Customized modification of surfaces - for example pretreatment of surfaces prior to bonding or coating and corrosion protection coatings - considerably extends the range of uses of many materials.

One area of work which extends to both these business fields is Surface and Interface Analysis. The fundamental knowledge acquired here contributes to the effectiveness of bonded joints and coatings.

The Department of Adhesive Bonding Technology and Surfaces is certified in accordance with DIN EN ISO 9001 and the material testing laboratory is also accredited in accordance with DIN EN ISO/IEC 17025. The Center Adhesive Bonding Technology is an internationally recognized organization for providing employee training courses in adhesive bonding technology and is accredited by the DVS-PersZert in accordance with DIN EN ISO/IEC 17024.
Technology transfer and training

Along with work, capital and raw materials, knowledge is the fourth essential factor for business success. Technological development is proceeding at an ever faster pace, making continuous training and follow-up training absolutely vital. Only qualified employees whose knowledge is continuously kept up to date can organize, evaluate, correlate and utilize information. This is a prerequisite for optimum commercial returns. Employee training is therefore a key activity, and especially so in high-tech fields. The Adhesive Bonding Technology and Surfaces department of the Fraunhofer-Institute for Manufacturing Technology and Applied Materials Research (IFAM) has taken on a pioneering role here. Under the general term “Technology transfer and training”, a great deal of work is being carried out to transfer R&D findings to practical applications directly, without intermediate steps.

The training courses of the Fraunhofer IFAM in the area of adhesive bonding technology illustrate how effectively knowledge is transferred to users in practice. Over the past 10 years Adhesive Bonders, Adhesive Specialists and Adhesive Engineers have been successfully trained at the Center Adhesive Bonding Technology (Klebtechnisches Zentrum), a training establishment accredited by the German Association for Welding Technology and Related Techniques (DVS) and the European Federation for Welding, Cutting and Joining (EWF). These qualifications – laid down in guidelines and standards – are already required as a precondition for employment in key areas of German industry where adhesive bonding technology is used. Employee training has hence also become a key aspect of quality management.

Knowledge – the vital factor for success
The importance of adhesive bonding in modern-day production

The requirements on modern-day products and components are becoming ever greater. These products and components must be smaller, lighter and faster and they must also be compatible with the environment and favourably-priced. At the same time, users are demanding higher requirements in the usage phase. It is only possible to meet all these requirements if a whole host of different materials can be effectively combined with each other. Due to new developments, the number of available materials is constantly increasing in all fields of technology. In order to combine metals, alloys, plastics, ceramics or glass to form effective composite systems, bonding technology must be employed. Without this joining technique, many modern-day products and applications would simply be unimaginable.

Adhesive bonding technology is therefore assuming an ever more important position in industrial production. Different materials can be combined with each other by adhesive bonding, with maintenance of their specific properties and good long-term stability. New construction methods are hence possible. In addition to their pure bonding function, adhesives can also be used to introduce other functions into the bonded joints, for example vibration damping, sealing functions and corrosion protection. Adhesive bonding technology can be universally employed, on a macro-scale and right down to a nano-scale.

Adhesive bonding technology only gives an impulse to economic growth and competitiveness if the total potential of this technology is transferred to everyday applications. This is achieved by the customized and optimized employee training courses which the Fraunhofer IFAM has successfully provided for many years. Adhesive Bonding has to be learnt!

A key technology for the highest requirements
Training and follow-up training is a continuous process

Qualified staff

New materials, new processes and new knowledge alone do not guarantee a good product nor commercial success. Vital for the latter is the transfer of knowledge. A requirement here is expertly trained staff. Training and follow-up training is an ongoing process because the speed of technological development is continuously increasing. The term “Lifelong Learning” highlights the fact that the development of professional skills is a continuous process of utmost importance to companies.

The right partner

The knowledge required for successful utilization of adhesive bonding technology is researched at the Fraunhofer IFAM. The institute has been actively involved in this area for more than 30 years and has accumulated a great wealth of experience and know-how. The Fraunhofer IFAM has up until now been a leading provider of employee training courses in adhesive bonding technology in Germany. At the same time, European harmonization has been achieved: The European Federation for Welding, Cutting and Joining (EWF) now recognizes IFAM qualifications in all countries of the European Union.

From research to practical application

The training courses provided by the Center Adhesive Bonding Technology focus on industry’s needs and are practically orientated. The Adhesive Bonder, Adhesive Specialist and Adhesive Engineer training courses are an example of direct technology transfer: The Fraunhofer IFAM, the largest research group in Europe in the area of bonding technology,
Know-how transfer using customized teaching strategies

IFAM R&D specialists also form part of the teaching team. They directly pass on their current technical findings and experience during the courses. The individual courses are constantly updated to include the most recent practical developments and they are customized to the dynamic developments of both adhesive bonding technology and manufacturing technologies. The high learning expectations of the participants is fulfilled by the Fraunhofer IFAM using modern didactics. The practical approach to learning that is adopted and the clear, application-orientated and up-to-date course documentation guarantee successful knowledge transfer. An interdisciplinary approach and “a broad outlook” form part of the various training courses.

After successful completion of the training courses, the participants are in a position to utilize the potential of adhesive bonding technology in an independent and innovative way. Regardless of whether one is involved with component design, construction, adhesive specific features and parameters, optimization and monitoring of the bonding process or design of the workplace: Employees are able to assess all factors which influence quality and they are able to make the correct decisions. Their knowledge is the basis for innovation!
Further information is available on the business fields:

- Adhesive Bonding Technology
- Surfaces.

IFAM
Fraunhofer-Institute
for Manufacturing Technology and Advanced Materials

Institute director:
Prof. Dr. rer. nat Bernd Mayer
Wiener Strasse 12
D-28359 Bremen

Telephone: +49 (0) 421/22 46-0
Fax: +49 (0) 421/22 46-4 30
E-mail: ktinfo@ifam.fraunhofer.de

Center Adhesive Bonding Technology
Head:
Prof. Dr. Andreas Groß
Telephone: +49 (0) 421/22 46-4 37
E-mail: andreas.gross@ifam.fraunhofer.de

Further information:
www.bremen-bonding.com