

More than 20 years of workforce training in adhesive bonding technology

Adhesive bonding will become the joining technology of the 21st century

Last year Fraunhofer IFAM celebrated a very special anniversary: 20 years of giving training courses in adhesive bonding technology. Prof. Dr. Andreas Groß has been involved from the very outset. He is Head of the Workforce Training and Technology Transfer Department at Fraunhofer IFAM into which the “Center for Adhesive Bonding Technology” is integrated. In this interview with “adhäsion” he describes the success of the adhesive bonding training courses and gives insight into the future.

Prof. Groß: Was it your own idea, more than 20 years ago, to start offering supra-company workforce training courses in adhesive bonding technology?

No, it was very much a shared idea. I started working at Fraunhofer IFAM in 1987. My third business trip was to Berlin for a work group meeting involving representatives from R&D organizations, industrial associations, adhesive manufacturers, and adhesive users. The reason for the meeting was to address the following question: What needs to be done in order to make the industrial use of adhesives more successful and more sustainable? When nobody knows why it hasn't stuck, it's (of course) all the adhesive's fault!

Was this a necessity or part of the business model of Fraunhofer IFAM?

Above all it was necessity! We had to get away from the belief that “anybody can use an adhesive successfully”. We had to get away from the thought that “even children in the kindergarten can use adhesives”. We had to get away from taking negative everyday thoughts about adhesives into the professional arena, namely knowing that “universal adhesives” cannot actually bond all materials. Indeed, there is no such thing as a “universal screw” – and that is something everybody understands. The driving force was clear – to promote the development of industrial adhesive bonding technology with the help of training courses and so promote industrial innovation.

Brief profile

Prof. Dr. Andreas Groß is Head of the Workforce Training and Technology Transfer Department at Fraunhofer IFAM into which the “Center for Adhesive Bonding Technology” is integrated. In addition, he heads various work groups on quality assurance in adhesive bonding technology in the Deutscher Verband für Schweißen und verwandte Verfahren e.V. (DVS), DIN/FSF, and CEN TC 256. He is also chairman of the work group on adhesive bonding in accordance with DIN 6701, a member of the Technical Committee of the Industrieverband Klebstoffe e.V., and deputy spokesperson of the management committee of the Fraunhofer Academy (FA).

At that time we were not thinking of a business model. We assumed back then that the workforce training in adhesive bonding technology would remain a subsidized business but that we could possibly acquire R & D projects via this instrument. Prof. Hennemann – our then institute director – always accepted this risk and supported me in every way. However, we never imagined that the number and scope of the training courses would increase so much, that we would collaborate with national and international partners, that we would carry out our training courses worldwide, and that the training courses would become a real “business segment” for Fraunhofer IFAM!

What is so special about the training concept? Who developed it and how are the courses designed?

A number of key words and phrases can be used to describe the training courses: always up-to-date from a technology standpoint, not product-specific, not industry-specific, not hierarchy-specific, accredited, workforce certification, methodically and didactically designed. I believe all these aspects are necessary for acceptance of the courses by industry. The main feature of the training courses at the Center for Adhesive Bonding Technology is that Fraunhofer IFAM is first and foremost a research and development organization – namely a “generator of knowledge” – but also provides training courses and so is simultaneously a “transferer of knowledge”. The course participants benefit from this in two ways: Firstly, the transfer of knowledge from the institute’s departments to the training courses ensures that the course contents are up-to-date

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Prof. Andreas Groß,
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and, secondly, any specific issues can be readily addressed by contacting experts in the technical departments. Having explained WHAT information the training courses cover, equally important to us was and is HOW that information is transferred. A good scientist is not necessarily a good tutor. For this reason we set up our own tutor training which continuously supports and coaches the tutors, using the latest adult education methods, during the development and implementation of the courses. This linking of R&D and training in this way is unique.

How readily was this training concept accepted by industry and how much is it appreciated today?

The first step is always difficult. I really underestimated how difficult it would be get others to understand the basic thought that trained staff, who know what they are doing, make fewer errors than non-trained staff. Training in adhesive bonding was primarily seen as a cost and not as an investment. The situation has, however, considerably improved. Training is now accepted by industry and for many companies is not only a means of preventing errors but is also seen as an instrument for generating innovation.

Can you give an example of the potential added value that can be created by using an adhesive rather than a conventional joining method?

This is a difficult question. The potential added value cannot be quantified. Naturally, modern lightweight structures and hybrid structures are essentially only possible using adhesives. Up until now though, there are no reliable figures for the added value. What I can say, however, is that after taking a training course the trained workers are much more alert to potential “adhesive bonding” issues. Potential sources of errors in the production are detected much earlier and new potential opportunities for using adhesive are much more readily identified. I am certain that the training courses are part of the reason for the continuous growth in the use of adhesives.

Are the course contents occasionally updated with new research findings?

Indeed they are and continuously so! The course participants trained at Fraunhofer IFAM can rightly say they have acquired the very latest adhesive bonding knowledge. That is indeed our claim! We also regularly provide so-called “refresher courses” to update former course participants with the latest knowledge. Just to be clear: The training courses are updated with new knowledge acquired from publicly funded projects and from other projects whose results we are allowed to publicize.

The European harmonization of training courses that was long planned has now also been implemented. How has this been accepted?

We can say today that the training courses have been accepted by industry in Europe. Also, our current project to internationalize the training courses in adhesive bonding technology is proceeding apace! In recent years we have held courses outside Europe, for example in the USA, China, South Korea, and South Africa, in either English or translated into the respective foreign language. In order to meet the growing demand for courses, we are now working together with national and international training partners. These partners are contractually bound to the Center for Adhesive Bonding Technology and use our course materials in accordance with our national and international quality standards.

And one final question, Prof. Groß: What is your prediction for the growth of adhesive bonding as a joining technique over the next 20 years? What will be the main drivers of this growth?

My answer is very simple: Adhesive bonding technology will become the joining technique of the 21st century! Just as rivet technology came to the fore in the 19th century and welding technology in the 20th century. My reason for this prediction is as follows: The requirements being put on products and components is constantly increasing: Higher speed, reduced weight, more stylish design, greater functionality, improved safety, and much more besides. And this trend of rising requirements is continuous! In order to meet all these technological, economic, and environmental requirements, new materials are being developed and utilized. The driver of this development is the need to meet future requirements. However, the individual materials alone – regardless of whether it be a metal alloy, GFRP, CFRP, plastic, or ceramic – will not be able to meet these growing requirements. Rather, it is the ability to use combinations of these materials that will be imperative in the future. So-called multi-material design is becoming ever more important, and this is where the potential of adhesive bonding comes to the fore: Only using adhesives is it possible for materials to be joined such that there is maintenance of the material properties and good long-term joint stability. Adhesive bonding also creates opportunities for customized component and structure design. All this, though, requires a trained workforce – from technicians and production staff to the engineers and designers, because the advantages of adhesive bonding can only be realized if adhesives are used correctly. The key to this is, and will continue to be, professional training in adhesive bonding technology.

This interview was conducted by Marlene Doobe (adhäsion).