TURNKEY CLEANROOM COMPLEXES AND ENGINEERING INFRASTRUCTURE. PROFESSIONAL EXPERIENCE OF THE COMPANY DEAXO IN RUSSIA

René Chalmakoff, Dipl.-Ing., General Director DEAXO*

DOI: 10.22184/1993-8578.2021.14.5.254.258

Received: 09.22.2021 y.

The development of "turnkey" cleanrooms is the contemporary task, in demand under the conditions of the growth both of Russian industry and the share of high-tech production, which requires complex solutions from the stage of design development to obtaining certification and post-launching service. DEAXO Company has been developing the advanced technological infrastructure of engineering systems and turnkey cleanroom complexes in Russia for more than 6 years. Within the most innovative, breakthrough fields of development of the national manufacture the company DEAXO creates and realizes exclusive smart solutions from the very idea of the project and the project negotiation till its launch and the further service of the advanced technological production facilities that meet all the requirements of the highest modern quality standards. The concern about professional skills of the employees and improvement of their engineering competences led to the creation of the training center where the new, ready to work in the DEAXO on the Russian market specialists are prepared. CEO of the company DEAXO René Chalmakoff shares the longstanding experience about working on the Russian and international market of semiconductor industry.

What is the philosophy of your company, what is your company message?

DEAXO is an international engineering company. We carry out the whole range of works related to design, construction, supply of equipment and materials, creation of high-tech engineering systems and turnkey cleanroom complexes. We create high-tech infrastructure for such innovative industries as microelectronics, semiconductor industry, pharmaceuticals, solar energy, LED industry, biotechnology, food industry, space and aviation industry, oil industry, hydrogen energy, data processing centres, etc.

One of the most important principles of our work is an individual approach to each client and high quality of work. We always attach great importance to a detailed study of the customer's object and close attention to detail. Our goal is to make our Customer's project successful. At the same time, our main business philosophy is to minimize the Customer's costs and support him throughout the entire life cycle of the project.

Your company has been working in Russia for more than 6 years. What is done during this time, are the goals that were put by the company's management at the time of its creation?

Really, created by a close-knit team of German engineers and technical experts, DEAXO set up a competence center in Dresden, Germany, but soon expanded its operations to Russia, using over local projects. In Russia, we have an opportunity to implement large, technological complex projects, and this is motivating.

How exclusive the activities of your company are currently in Russia?

Our more than twenty years of experience in the field of high technology engineering determines

* DEAXO GmbH Zur Wetterwarte 50, Haus 337/E D-01109, Dresden.

our successful work in creating efficient and reliable modern production facilities.

At the current moment, being a technical center, our Russian office takes an active part in international projects. The local team of specialists has European design experience and, of course, knowledge of Russian norms and standards. If necessary, taking into account the optimal ratio of cost and result of work, we are ready to implement local projects with the involvement of groups of European specialists. All this allows us to provide exclusive services to our Russian Customers, transferring to them the experience of leading foreign factories and introducing know-how into our projects here.

What orders completed for the last year would you like to tell readers of our magazine? What is the geography of objects built with the help of DEAXO?

We all remember that the past 2020 was very difficult. The coronavirus pandemic, to put it mildly, has had a very strong impact on global industrial development trends. This year was also very difficult for the microelectronics market all over the world. But we never stopped in our work and during the last year we have completed several projects in Europe. For example, with the help of our joint Russian-German team, we have implemented a large project in the Czech Republic (design and PCM), as well as several projects in Russia and Germany for the design of research laboratories and pharmaceutical production.

What are the plans for the development of the company, do you connect to the national or federal scientific and technical projects yet?

DEAXO Company trust in development of semiconductors in Russian Federation and we are happy to be part of this development.

Does DEAXO works with the country's universities and, if so, what exactly is being done? What is the company's personnel policy in Russia?

We do not have direct agreements with Russian universities, in our days not so many universities has specific education, for example, for cleanrooms. Our HR strategy is to work with young specialists with good basic knowledge and English language. We have good cases with specialists who have grown in our company from a student to an experienced qualified engineer.

How did the BIM technology have proven to design the integrated construction of buildings and premises for high-tech industries?

BIM modeling technology in our field is a very useful and multifunctional tool. We have made a choice for ourselves long ago in favor of the BIM toolkit. All design work is carried out by our specialists in Autodesk Revit. This is the standard for our company. Design

at any stage, whether it is a conceptual design or the preparation of working documentation, including the development of solutions for connecting technological equipment (hook-up) – all this work is carried out by us based on the principles of BIM modeling. Based on the results of the design work, our Customer receives a digital model – copy of the object, which can later be used by him both for construction and for its subsequent operation. After all, the fundamental difference between a BIM model and any others is the ability to set any parameters for each element and not only graphical ones. Also, in my opinion, an important advantage of developing a BIM model of a complex industrial facility is the ability to prevent collisions when designing complex engineering systems. I think the advantages of working with a BIM model during the construction process are also obvious. Simulation of work progress, coordination of systems and sub-contractors, visualization, quick preparation of bill of materials and bills of quantities, etc. The experience we have gained in BIM over the past five years and the extensive database of materials and equipment we have collected, greatly help us to significantly speed up the execution of modeling work and, as a result, reduce project costs. We are pleased that the Russian government also continues to promote the BIM strategy at the federal level. It's nice to watch. We will be able to significantly speed up the design of large facilities, reduce the risk of errors during construction, and maybe very soon we will see digital models of "smart cities".

How long does the process of preparing the documentation of the objects being developed in accordance with the current Russian and international standards?

Answer: It's really good and tricky questions. On our market, we can split projects for two types:

- Standard projects (design and execution)
- Fast-track projects (design-build)

If we speak about "simple" projects like small R&D labs development of project and working documentation can be around 6 months. If we speak about big fabs, it can be much longer.

Fast-track projects it's a bit different case, we are making proper project planning together with client and defined steps of execution and making design step-by-step for installation neediness. Our best result was 10 month for modernization of foundry.

But the success of all projects is proper the technical task and finalized process of Client. Without cooperation with client to make projects in our business – not possible, due the fact, that in 90% Client in process holder. And one of the biggest challenge is to collect a source data for project, for this work we developed our internal standard documents, which helping Client to bring his thoughts in engineering world.

What are the class of purity of the objects were built in Russia with your company? How is the procedure for certification of premises?

In Russia we build and design clean rooms from ISO8 to ISO4.

Also DEAXO provides a full range of works on qualification of engineering systems and cleanroom complexes according to ISO and GMP standards. For all testing and qualification work, we have internal standard procedures that take into account all the requirements of SEMI standards, GOST R ISO 14644-1-2017 GMP and other international standards. Before starting work, we provide the client with a measurement protocol for approval of his internal procedures.

Qualification services at all stages – DQ, IQ, OQ, PQ.

The specialists of our company have modern specialized equipment for qualification of engineering systems and certification of cleanroom complexes. Measuring equipment is regularly calibrated and verified.

Have you been built by your company objects for nanoindustry and microelectronics?

Of course, as we noted earlier, in Russia, we have implemented several significant projects – representatives of these industries (modernization and new construction), as well as research laboratories. In Europe and Asia, our customers are large world companies.

In which areas of activity – biotechnology, medicine, space and aviation industry, chemistry, pharmaceutical and semiconductor industries were built most of the objects?

The specialists of our company designed, built and successfully started-up a significant quantity of facilities for the needs of different industries, such as microelectronics, pharmaceuticals, solar energy, and food industry and research laboratories. One of the priority areas

for us remains the enterprises of the electronic industry, which implement the following technologies: crystal and assembly production, MEMS sensitive elements, silicon wafer manufacturing, integrated circuits, electronic components production, production of infrared products, power electronics, LED industry, microwave modules, surface mounting, gyroscopes production, photoelectric converters, electro-optical devices, etc.

What equipment do you use in the constructed complexes?

Hard to answer to this question, we are working with many market players we have our own production of the chemical reagents and process gases supply systems and some suppliers of equipment, with whom we are working for many years, but our main goal of the company to fulfill client requirements. That's why we also use strategy fit-to-budget. It means that we are making market investigation, making audit for producers, and as result client is getting comparison table (3–4 suppliers per position) and making decision with a Client. Our goal is to make technically correct decisions on time and within the announced budget.

How is the maintenance and repair of engineering systems and equipment organized after the construction of the object and putting it into operation?

We always propose to our client after sales services, we have our local team for maintenance and service, which had all necessary equipment. To perform maintenance and service of engineering systems, we offer individually selected solutions with a developed and coordinated work schedule.

Due the fact, that we have branches in Europe and Asia, we are able to help client to find and deliver specific spare parts. We made once a calculation about economic efficiency of using outsource specialist for client in comparison with having it on board. The result of this calculation was quite attractive to our Clients.

How do you assess the Russian market? What are the prospects for your company in Russia in the future?

In my opinion, Russian market is one of the most attractive and underestimated market. You have good knowledge basis and many interesting technologies, but you don't have a professional society, who can crow-up together and support each other. In Germany we have a community, which named "Silicon Saxony" where is a number of members, who are competitors on the market, but they are developing this business together. Our dream and wish for Russia start to communicate between producers, suppliers and final

Clients. I know, that in Russia you made big steps further (for example yearly microelectronic summit in Crimea), but here it's a long way.

It is good, that Russian government start to look at 5G technology with a goal to increase also internal market not only for chips, but also for final product, which will be interesting for end users.

Our main goals in Russia to increase our influence to local market and to be part of this grooving society.

Did the principles of the company changed with the parish of a pandemic? How did it affect the company's activities?

One of the biggest value in our company are people, due the situation with COVID-19 we made certain changes in our daily work. During pick of Covid we sent to home office all our team and we were able to do it, because we have several tools in our company.

We finished implementation of BPMS ELMA in our company, which helps us in daily routine works and which is helps us to stay in touch from different places.

For engineering department we use BIM360 (Autodesk) cloud solution, which can provide an access to documents from home/office.

As result for Russian market we have no effect to our activities, but for our Europe projects (where our Moscow team has been involved) we had a problem with traveling and this work has been handed over to our GmbH office.

For current moment, we come back to our normal office work.

Is the company engaged in interaction with Russian scientists, is there a company research center where the Russian scientists and experts accept or could take part?

For current moment, we don't have any opened R&D centers in Russia, but in same time we participate in different association like ASENMCO.

How the professional development of specialists of the company is organized? How does the DEAXO Corporate University works? Are the Russian specialists, scientists, engineers and students taking part in it?

Each company today faces the issue with qualification and competency of personnel and each of such companies have its own way to solve it.

Working in our field, we also faced a situation where the market cannot provide us with ready-made specialists. And to improve the current situation, it was decided to create an internal training center, the main goal of which is to develop engineering competencies among DEAXO specialists. Within the organization, we provide various trainings, ranging from specific disciplines for our business (for example, cleanroom systems, special gases, etc.), but also general things, such as teaching a foreign language for employees. Of course, a corporate university is not a separate branch where we can attract some specialist from the outside, it is our feature-tool to bring people to the level that we need. This brings the company motto "We make it work, We make it right" in real action.

Are the new technologies in the company are being developed? If so, what technologies do the company specialists work at present?

DEAXO is not a manufacturing company, we don't develop new technological processes, but we are in contact with major players in the European market and are always happy to help our Clients with technology transfer.

Is the company interested in close relations with higher educational institutions of Russia? If so, tell us about the activities of the company on working with talented youth and students?

Of course, we are extremely interested in scientific and technical cooperation with higher educational institutions and industrial enterprises. As we said before young specialists are really important for us and we will be glad to work with universities. Main requirement to all candidates it's a will to learn and continues improvement.

What would you like to tell young specialists about a career in your company? What does the Carrier Development Program mean?

Join the DEAXO Company! We work with high-tech technologies, which are the most interesting on the market.

If you want to grow up in interesting field, if you want to made an experience with project around all world and if you have a will to learn something new – DEAXO is company for you.

In our company Career Development Programme is a way to provide to employee position where he will be more effective and will have a chance to develop further.

As you know there is certain ways for development horizontal and vertical, we always provide a chance to choose. We had a case, when people grooved from grade 3 (beginners) to leads position or how our lead engineer decided to try his skills in PM field.

Yearly we are making an assessment with employees, where we are defining goals for development and steps, which has to be done.

Tell us about the plans of the company in the near future, what are the prospects of the company you see in the next 3–5 years?

Our main goals for the coming years are to increase the team in Russia to at least 50–60 engineers who will work both in the Russian and global markets. Of course, we will continue to work with major players in Russia and interact more on government projects. We believe that Russia has made a huge step forward in the development of the electronics industry. It certainly plays a significant role in ensuring the technological development of Russia. The adopted strategy for the development of the electronic industry, the goals under consideration, the tasks set and the described problems of modern Russian electronics, formed a good integrated approach to the development of production forces. The DEAXO team, in close cooperation with our partners, will be happy to provide all kinds of support throughout the life cycle of our industry and provide a solution to any technical problem that arises.

Thank you for the interesting interview!