Jan Pilarczyk

70 years of Instytut Spawalnictwa in Gliwice

Beginnings

Instytut Spawalnictwa was founded on 28 March 1945 in Katowice at the premises of the Silesian Technical Scientific Centre on Krasińskiego street (today's seat of Silesian University of Technology).

The Human Resources and Education Department in Katowice responsible for organisation-related affairs had their own candidate for the position of Instytut director, i.e. future professor, Józef Pilarczyk, yet the Ministry of Industry in Warsaw proposed future associate professor Bolesław Szupp. Having two candidates, the Human Resources and Education Department appointed the candidate from Warsaw (significantly older) for the position of director and the candidate from Katowice (significantly younger) for the position of deputy director. The newly founded establishment was named "Państwowy Instytut Spawalniczy" /National Welding Institute/.

The first task of Instytut was to train gas and electric welders, being in great demand for a country rising up from war-inflicted ruins and debris. Instytut gradually developed, yet cramped rooms proved an obstacle hindering further progress. Therefore, in search for greater working space, the site at Błogosławionego Czesława Street (today's street name; the name of the street had previously been changed from Czesława Street to Henryk Wiatrek Street and next to Feliks Dzierżyński Street) in Gliwice was obtained. The site was built-up, yet some old buildings had to be partly demolished, reorganised, adapted or even replaced with new

One of the first welding courses

Building of the Centre for Welding Education and Surveillance today (below – the building in 1947)

Prof. Jan Pilarczyk - Director of Instytut Spawalnictwa in Gliwice

ones. The adaptation and construction of the first Instytut buildings took place in 1947-1949. In 1947, the name of Instytut was changed to "Hutniczy Instytut Spawalniczy" (Metallurgical Welding Institute). On 1 July 1948 Instytut obtained its official name "Instytut Spawalnictwa" and the institution previously tasked with training welders started to change gradually into a genuine research institute. In 1949 Instytut was moved entirely from Katowice to Gliwice.

The primary objective of the research activity undertaken by Instytut was to find and prepare a staff of research workers. In 1950 the first Scientific Board was appointed. Although at the end of 1950 welding training was outside the scope of Instytut, the establishment continued to supervise the training. The separated Training Centre extended its offer by also providing engineers and technicians with courses for welding inspectors, constructors and technologists.

After 1951, Instytut conducted extensive research and development activities, performing works which enabled the popularisation of welding engineering, concentrated on arc welding and oxygen cutting, in the national economy. At the same time, mechanical and electric system solutions as well as control systems of new welding devices were designed and compositions of new welding consumables were developed. New concepts turned into prototypes (devices) and laboratory products (materials and consumables), next, small lots were prepared, and finally, newly developed products entered a greater scale of production in experimental facilities or industrial companies.

In 1954-1956, at Instytut Spawalnictwa, Zakład Budowy Urządzeń Spawalniczych (ZBUS – Welding Machinery Production Company) was created to be later (i.e. in 1977) transformed into Zakład Doświadczalny Instytutu Spawalnictwa (ZDIS – Experimental Facility of Instytut Spawalnictwa). Both ZBUS and ZDIS concentrated on the production of welding machinery and consumables. In 1956, Instytut Spawalnictwa became a member of the International Institute of Welding. The extensive development of Instytut and of Experimental Facility (Zakład Doświadczalny) took place in 1960s. It was then that a number of buildings, later modernised and successfully used until today, were erected.

Logo of the International Institute of Welding and the European Federation for Welding, Joining and Cutting

1970s

The 1970s brought numerous new fusion and pressure welding methods with which Instytut intensively worked. Research involved tests on CO_2–shielded welding, gas mixture-shielded welding, plasma welding and cutting, electroslag and electrogas welding, friction welding, mechanised and automated thermal cutting etc. The research was accompanied by extensive tests concerned with the weldability of many modern structural steels manufactured by Polish steelworks. The industry received numerous stations and whole production lines used for mechanised welding and cutting. In the 1970s huge research cycles were organised in five-year periods and many problems of all industrial sectors were covered. Instytut was involved in solving such problems, often referred to as "principal". An important event in Instytut's activity was organising and running the Postgraduate Welding Courses along with the Silesian University of Technology. Lectures and classes were held at Instytut, with experienced Instytut workers assuming the duties of lecturers. The Post-Secondary Vocational School for Welders existed for 10 years, until 1980.

1980s

The 1980s mark a very difficult time for Instytut Spawalnictwa. A complex political and social

situation, with workers leaving Instytut or retiring (sometimes early), made work unstable and the financial situation, particularly in relation to wages and investments, poor.

In spite of the difficult reality, in 1981-1985 Instytut coordinated principal problem no. 05.15 entitled *Methods and Resources of Welding Mechanisation and Automation*, and in 1986-1990 the Central Research and Development Programme no. 7.3 entitled *Welding Techniques*.

1990s

In the early 1990s Instytut Spawalnictwa started operating in entirely new circumstances of competition and a free market-based economy.

In 1991 a new law concerning Polish research centres came into force. The law gave such centres independence and freedom, yet connected with complete financial self-sufficiency and full responsibility for decisions taken. Budget resources, coming from the technological development fund, previously spent on the operation of such centres, were slashed overnight, whereas of related ministries, formerly supporting and looking after the centres, remained only their founding bodies.

Many research and development centres failed to cope with the new situation. The lack of financial resources led to a rapid shrinkage of the centres, faced with the loss, within only a decade, of approximately 60% of their workers. Many of the centres sold off or let out their rooms or whole buildings, while many others closed down. Numerous research and development centres experienced financial difficulties such as limited possibilities of repaying their obligations, maintaining low remunerations or lacking prospects of rebuilding their personnel, as well as shortages of investment funds for equipment, modernisation and repairs.

The existence of research and development centres was even harder due to a negative image of them created by important officials and organisations in Poland. One of the first deputy prime ministers reiterated that research and development centres were "relics of socialism" and kept asking "How long shall we wait for the reform of these socialist relics draining the national budget - money, which should be spent on good basic research?" The programme of one of the political parties, self-proclaimed as the most law-abiding, assumed the liquidation of research and development centres (JBR – acronym in Polish) – "These centres are communist strongholds and need to be fought against!" Journalists tend to make fun of JBRs, mispronouncing them as PGRs (socialist farming cooperatives). JBRs – PGRs?

Head office building of Instytut Spawalnictwa today, built on the site of a small building of 1947

The difficulties of this period did not discourage Instytut Spawalnictwa, rather the contrary. In 1990, facing a choice between quickly adapting to new conditions or a prolonged but inevitable fall, Instytut chose the former by adopting a systematic transformation policy. However, the adaptation to the new reality

entailed deep reconstruction of Instytut – intensive search for new profitable tasks had to respect an ambitious assumption according to which those new tasks would not be outside the scope of welding engineering.

The personal reconstruction of Instytut started with the selection of a director – for the first time not by handing in the nomination for an indefinite period, but through a competition for the position of a term of 5 years. The director accepted the position, not being forced, but on a free will basis, perfectly aware that the future of Instytut would be the result of their own initiative. As it turned out, the Director elected in 1990 was chosen four more times in the years to come.

Conventional electric arc welding

The change of the director entailed, obvious in such cases, organisational and personal changes of Instytut management. The new organisational structure was significantly simplified. Many small, inefficient and unprofitable units were liquidated along with many managerial positions. As a result, research workers not tied to organisational structures could join any research teams formed to solve specific problems. Necessary changes would also have to involve the mentality of workers, eventually resulting in dismissing persons not prepared or unable to change their habits and replacing them with workers capable of working in a new, modern style. Welding engineering-related issues are not limited to welding methods and technologies, structural materials, welding consumables, filler metals and equipment. For this reason, the scope of Instytut activity was extended with training and certifying welding personnel, certifying companies making welded structures, testing and certifying welded structures, testing and certifying welding products, developing standards, introducing regulations and legal acts as well as preparing manuals and guidelines.

The search for profitable tasks in a free market was not easy for Instytut, yet not impossible. In each economy, welding engineering is ubiquitous, welding production is the domain of many companies and demand for various welding-related works is very high. Successful preconditions include a proper offer based on present knowledge, high personnel competence, fast work rate, reliability and timeliness of service, as well as great flexibility during negotiations with potential customers.

Welding engineering-related issues are not limited to Poland alone. Much is going on in European and worldwide welding engineering. There must be a "connecting link" between Poland and overseas countries, and this is precisely where Instytut can play its role. Instytut has always had good and extensive contacts with welding engineering institutions and companies all over the world, transferring foreign novelties to the domestic market and then quickly to industrial companies. Taking up such a great range of tasks has continued to provide a lot of work for many people. Instytut has spared no efforts not to neglect any of potential tasks. In many cases, Instytut's preparation for undertaking all forms of activity required partial or complete transformations as well as establishing new contacts, gaining new knowledge and experience, and obtaining new equipment.

Years of persistent, methodical, difficult and expensive activities has built Instytut's offer covering practically all needs of industry.

15 Years of a New Century

Poland's status of first, associate and then, full member of the European Union has imposed the necessity of adapting to EU regulations, one of which, concerned with research and development centres, required that such institutions should be "non-profit" establishments and refrain from production. The first reason for such a formulated requirement was the necessity of ensuring objectivism of an accredited and notified certifying centre. Such an impartial approach could not be guaranteed while being in competition with industrial companies. The second reason was connected with the impossibility of competing with industrial companies on an equal basis due to certain differences in regulations governing taxation in research and development centres and in industrial companies. As a matter of fact, the Experimental Facility of Instytut was a production facility.

Respecting EU regulations, at the end of 1999 a decision about complete restructuring of the Experimental Facility of Instytut Spawalnictwa was taken. The decision also assumed the formation of an independent business enterprise (limited liability company) with the participation of a strategic investor, if any. At the same time it was decided that Instytut Spawalnictwa should hold the controlling stake in the newly formed enterprise. The first entity to close down was part of the Experimental Facility located in Sławięcice (near Kędzierzyn-Koźle). Due to the unprofitability of this branch operation outside Gliwice, selected personnel and profitable activity were moved to Gliwice, with the remaining part of the company to undergo liquidation. In 2001-2003 a legal team prepared necessary yet very rich documentation, many issues were consulted with the Scientific Board of Instytut, many new and difficult requirements were formulated by the Ministry of Economy (Instytut founding body) and the Ministry of Treasury (decision-maker in relation to ownership changes). Finally, on 1 June 2004 a new business entity "Zakład Budowy Urządzeń Spawalniczych ZBUS Spółka z ograniczoną odpowiedzialnością" (ZBUS Welding Machinery Production Limited Liability Company) was established. While discussing the name of the company it was agreed that the company name should be that of the former Welding Machinery Production Company (ZBUS).

Modern disc laser station (inside and outside)

After 1991 Instytut started to quickly adapt to the new reality, undergoing deep and thorough transformation to become a player in a free and competitive market. The great reconstruction involved organisation, personnel, core activity, equipment and interior design. In 1990-2015 Instytut buildings erected in 1945-1970 were thoroughly modernised and equipped with new machinery. The modernisation also involved the entire Instytut infrastructure.

Intensification also affected activities concerned with welding methods and technologies, structural materials, filler metals, welding consumables and welding equipment. Instytut undertook new profitable tasks, only in the area

Latest electron beam welding machine

Dual-channel welding parameter recorder (ArcWeld)

of welding engineering, including welding personnel training based on national and European programmes, surveillance over welding training in Poland, assessment and qualification of companies dealing with the fabrication of welded structures, tests in accredited laboratories, testing and qualifying technologies, certification of welded products, welding personnel and quality systems, developments of PN-EN standards, introduction of regulations and laws as well as the development of instructions and guidelines.

The main objective of Instytut, i.e. adaptation to rules and requirements of the free market economy, was supplemented with another, no less important, i.e. adaptation to European standards. The year of 1992 saw the creation of the European Union, which Poland initially joined as an associate member. The EU appointed a number of organisations, one of which was the European Federation for Welding, Joining and Cutting (EWF). The federation continued the activity of the former European Council for Cooperation in Welding (ECCW) acting since 1974 within the former European Economic Community (EEC). The primary task, first of the Council and next of the Federation, was to create a uniform system for educating and training welding personnel, recognised by all partners.

The EWF invited Welding Institutes from Poland, Hungary and Czechoslovakia to collaborate on an observer-member basis. The first meeting took place in Brussels in April 1992. Out of the three Institutes, only Instytut from Poland operated in the first years of membership (Hungarian Institute was closed down, and Czechoslovakia split into the Czech Republic and Slovakia).

In 2004 Poland joined the European Union. However, Polish welding engineering "joined" the EU much earlier. In 1996 Instytut obtained, on an extraordinary basis, the status of an EWF Authorised National Body, which as a rule is reserved only for full members, and in 1997 – the status of a full member. The year of 1997 was also the moment when the International Institute of Welding (IIW) started collaboration with the European Federation for Welding, Joining and Cutting in order to extend the scope of the European system for training and educating welding personnel for countries outside Europe. In 2001 the international global welding engineering system came into existence.

Instytut Spawalnictwa, as the only institution in Poland being fully authorised by the European Welding Federation and the International Institute of Welding, is involved in the harmonised system of training, examining and certifying welding personnel and is entitled to issue European and international diplomas and certificates for welding personnel (European and international welding engineers, technologists, practitioners, specialists and European welders) and enterprises. To today, several thousand such documents have been issued. For welding personnel and companies dealing with welding

fabrication these documents are a ticket to the European market, enable soliciting export contracts and are recognised in Europe and all over the world. For overseas partners Instytut Spawalnictwa has become the best known institution in the Polish welding engineering sector. For reasons resulting from legal regulations and standards, Instytut cannot be replaced by any other national organisation.

Instytut Spawalnictwa joined the consortium Śląskie Centrum Zaawansowanych Technologii (Silesian Centre for Advanced Technologies) coordinated by the Silesian University of Technology created on 1 April 2004 by the Ministry of Scientific Research and Information Technology. In the Centre, the Director of Instytut performed the function of the deputy president of the Scientific Board and coordinated one of seven "joint research programmes" entitled "Manufacturing Technology and Implementation Development for Modern Materials and Composites and Modern Technologies for Joining These Materials". The Centre finished its activity in 2012.

On 1 October 2010, Instytut Spawalnictwa ultimately changed its controversial name from a "research and development centre" to a "research institute". This change was possible due to a new law (Journal of Laws no. 96, item 618) on research institutes. The law was developed with significant contribution of Instytut, which was possible due to many years of the director's activity on the Central Council of JBRs (Research and Development Centres, i.e. today's research institutes).

Very important for the activity of Instytut Spawalnictwa are projects obtained from various sources. There was a time when projects were obtained from the State Committee for Scientific Research, and next from the Ministry of Scientific Research and Information Technology as well as from the Ministry of Science and Higher Education, and recently, from the National Centre for Research and Development and from the National Science Centre, proprietary research projects (grants), development projects, targeted projects, ordered projects, or special testing equipment-related programmes. There is no space to mention all those numerous projects here, yet some special projects could be enumerated, such as a project implemented within the confines of a Sector Operational Programme for Development of Humans Resources or an EU project performed in conjunction with renowned European research institutions entitled "Econweld – Economically Welding in a Healthy Way" (Collective Research Project). Instytut was also a beneficiary of an EU project "Strengthening Institutions and Compatibility Assessment Systems" administered by the Ministry of Economy, Labour and Social Policy covering the improvement of management and operation systems with the help of a consortium composed of normalisation organisations AFNOR and DIN.

Adapting to collaboration with small and medium enterprises, Instytut held the accreditation of the Polish Agency for Enterprise Development within the confines of

Fatigue testing station

Testing station for investigating structural transformations in steels

the programmes "Introduction to Quality" and "Innovations and Technologies for Enterprise Development" implemented within the PHARE fund. Within the confines of the Regional Innovation Strategy for Silesia (RIS), Instytut was an active member in the working group "Infrastructure of Technological Testing and Development" aimed to develop and implement innovation strategies for Silesia.

The IT base of Instytut, developed over more than ten years, has been excellent in providing Instytut research workers with very good work conditions and direct contact with Instytut key accounts and external partners. For several years Tygodnik Rynku Informatyki i Telekomunikacji "TELEINFO" (IT and Telecommunications Market Weekly) rated Instytut Spawalnictwa among the élite 100 best computerised companies and institutions in Poland.

The core activity of each research and development institution is research, without which, no institution can normally function or perform any serious activity. Providing scientific and technical information, education and transfer of knowledge, expert opinions and consultancy, normalisation works or certification processes etc., as long as they are to be provided on the highest possible level, should be supported by previously and consistently conducted basic and applied research. For this reason, Instytut Spawalnictwa pays a lot of attention to welding-related research. All obtained tests results are implemented in various forms. Research is conducted in a complete R+D+I cycle, i.e. research, development and implementation. In parallel to basic and applied research, Instytut Spawalnictwa offers and performs verification and check tests in the Welding Testing Laboratory being an integral part of Instytut. The laboratory holds an accreditation certificate issued by the Polish Centre for Accreditation as well as is in possession of approvals of the Office of Technical Inspection and those of Classification Societies (Polish Register of Shipping and Bureau Veritas).

Presently, Instytut Spawalnictwa is the leading and central research and development centre of Polish welding engineering, being the only institution of this kind in Poland. In recognition of successes achieved during the creation of the European Research Area, Instytut obtained the status of the Polish Welding Centre of Excellence, conformed by a certificate issued by the Minister of Science. The status, among other things, results from the implementation of a project entitled "Polish Welding Centre of Excellence" performed within the confines of the 5th Framework Programme of the European Union. For several years Instytut has maintained the status of a Maria Curie Training Site.

Instytut Spawalnictwa and its research workers have been awarded and decorated numerous times, with the most valuable medals received at the International Fair for Innovations, Research and New Technologies. Instytut collaborates with many organisations directly or indirectly related to welding engineering, such as Polish Chamber of Steelworks (PIKS), Regional Chamber of Commerce and Industry(RIPH), International Fair in Sosnowiec, Poznań and Kielce, Welding Section of the Polish Society of Mechanical Engineers and Technicians, Polish Welding Society (PTS) etc.

Instytut's customers as well as domestic and overseas partners are counted in the hundreds. Instytut Spawalnictwa is recognisable in Poland and abroad, being an active full member of two large welding organisations, i.e. European Federation for Welding, Joining and Cutting (members from 31 countries) and the International Institute of Welding (members from 56 countries). Instytut enjoys the status of an Authorised National Body granted by both these organisations.

Instytut has implemented a PN-EN ISO 9001 quality management system as well as has a Welding Testing Laboratory accredited according to PN-EN ISO 17025. Due to the authorisation of the Welding Testing Laboratory and that of

the Certification Centre by the then Ministry of Economy, Labour and Social Policy, Instytut has been, since 1 May 2004, an EU Notified Body in testing and certification for CE marking in the scope of Guideline 73/23 (low-voltage), 97/23 (pressure vessels) and 87/404 (simple pressure vessels).

Presently, Instytut equipment and machinery is very good and comparable with those found in the world's best welding institutions. Instytut has modern arc welding equipment, a full range of excellent lasers for welding, cutting and many allied processes, a state-of-the-art electron beam welding machine, devices for modern all-method pressure welding, brazing equipment, a wide range of control and measurement devices as well as simulation equipment and software. Instytut personnel are significantly rejuvenated, thus having a development potential for many years ahead. Young assistant researchers draft their doctor's dissertations advised by professors from Instytut and/or from collaborating universities. Schedules of works are agreed to by Instytut management and the commission for research personnel development acting within the Scientific Board of Instytut. Subjects of doctor's and habilitation dissertations are synchronised with research issues of Instytut.

Instytut's domain includes extremely needed, attractive and modern activities, i.e. material joining and allied techniques. Approximately seven thousand prospering businesses in Poland, eighty thousand welders (plus additionally sixty thousand working part-time) and approximately seventeen thousand senior technical workers directly or indirectly use Instytut services. Approximately 2000 people participate annually in seminars and courses organised by Instytut, with 2000 individuals seeking Instytut professional guidance. Without false modesty it can be stated that due to the 70 years of mammoth work of many generations of research workers, Instytut can take pride in significant achievements which have been taking place in its experimental facilities, workrooms, centres and Instytut departments.

Instytut has ambitions prospects of further development including extensive plans of being useful for all Polish organisations needing support in welding engineering, and, first of all, for companies involved in welding fabrication.