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INDUSTRIAL HERITAGE OF THE TORPEDO FACTORY IN RIJEKA Site, artifacts and archives

Rijeka economic development and roots of industrialization

Location of Rijeka in Quarnero gulf, in most Nord part of Adriatic Sea determined the town to be historically connected with traffic, port activities, with shipping and shipyard business.

Rijeka was crossroad for amber trade, in Antic times it was visited by boats from east and south Mediterranean's. For Romans it was a castrum for troops to rest and place to go further to east and Nord. In Medieval times Rijeka was a small costal town, with local port for fisherman and Adriatic trade, with growing shipbuilding business, in it lived no more than 3000 inhabitants.

The economic development in background of town, in Croatia and Hungaria, opened the new business opportunities. Faster growth of Rijeka started in the beginning of 1700. Town and port of Rijeka, was connected with eastern part of Habsburg empire, and in 1719 by patent of King Carlo VI Rijeka (port of Trieste, in same time, too) was proclaimed "free port". Few year later was build its first lazaret, and the «Carolina road», the first direct modern road (after Roman times) which directly connected Rijeka with its background, with Karlovac, Zagreb and Budapest. Hundred years later an other more modern road was build to Karlovac again, the «Luisiana», it was most modern road in Europe in that time. Railway line to Karlovac, Zagreb and Budapest was built in 1873. Another one to Ljubljana and Wien¹ in same year

After Rijeka was connected with its background by modern roads and railway lines, all other business activities flourished, the most important was modernization of port facilities. First Rijeka port was in the bed of Rječina river, later new big and modern artificial port was built in front of town. In mid of XVII. Century was opened sugar refinery, biggest in all empire. In the beginning of XIX. Century on Rječina River was build the paper mill (in 1821), and there in 1835 was put in function the first steam engine in this part of Europe. It was the beginning of industrial revolution in Rijeka, and twenty years later in Rijeka had started other two most modern industries, in 1852 the "Chemical factory", and in 1853/4. The "Metal foundry".

The new "Metal foundry" was the beginning of new modern Rijeka's metal manufacturing industry, which later become first producer of ship steam engines and steam iron ships, and there was invented and produced first torpedo on the world.

¹ Povijest Rijeke, urednik Danilo Klen, Rijeka 1988., 137-139 i dalje.

Start ad development of Rijeka «Metal Foundry»

In the west part of the city was located the first modern metal manufacturing industry in Rijeka, it later became main location for all important Rijeka's industries. Up to then in Rijeka many craftsmen were working with metals, but they were unable to cope with problems in repairing iron steam ships and their engines, which were regularly coming in port of Rijeka. One of the first shipping lines of Triester «Osterreichische Lloyd» came to Rijeka in 1837. Ships and steam engines were quite fragile in that time, and in case of any ship failure, Rijeka needed expertise in this new field.

New steam engine technology was already in Rijeka, they were working in few places, first steam engine came in paper mill in Rijeka in 1835 it had 18 HP, in tobacco factory in 1849 (16 HP), in 1851 in sails factory (8HP), and in gas producing (4 HP), in 1852 in chemical factory (25 HP). Strongest steam engine was installed in flour mill in 1853, it had 40 HP, and one in «Metal foundry» in 1853/4 with 20 HP. More than 1/3 of all steam engines in Croatia were working in that time in Rijeka².

Rijeka had some experience in big business projects, hundred years ago Rijeka had the biggest sugar refinery in Monarchy, now on same place was working Tobacco factory, there were working more than 2000 people (women and kids), Paper factory was producing good quality paper and was getting awards all around world. Beside flour mill, which was big and modern, most challenging project was opening of Chemical factory and Metal foundry.

The new «Metal foundry» was established as factory for repairing, or made new, steam engines, to repair or make new iron steam ships, to cast iron, copper bronze, to make anchors and so. The new stock company was started with modest capital, 40.000 forint (Chemical factory was started with 150.000 f.; Paper mill had 500.000 forint capital in that time)³. Founders of the company were wholesale merchant Iginio Scarpa, than president of Chamber of Commerce, Francesco Jellousheg, and shipping forwarder, Walter Crafton Smith, co owner of the Paper mill, and Giuseppe Verbenas, ship-owner. The Director was G. Verzeznasy; members of the Board were P. Scarpa, Giovanni Francovich and Carlo Sporer⁴.

Contemporary Chamber of Commerce report said; «The factory was started «grandiose», to employ up to 400 workers, but there worked less than 25 men, ... the problem was in finance»⁵ It was an other problem, Rijeka had not experience in such type of industry, and to fully activate the foundry they where looking for some expert who has the knowledge in manufacturing with metals. In that time the best engineers come from England, and the owners of the «Foundry» found the suitable persons for such type of job in Trieste, there was

² Rudolf Bičanić; Doba manufakture u Hrvatskoj i Slavoniji (1750-1860), Zagreb, 1951, str. 222.

³ Bičanić, isto, str. 224.

⁴ Alamanacco Fiumano per l'anno 1858., Rijeka 1858, str. 33.

⁵ Rapporto generale della Camera di commercio e d'industria in Fiume, 1854-1857, Rijeka 1858., str. 71-72.

working young English engineer, Robert Whitehead⁶, who come in Rijeka in 1857, and he and his family lived and worked almost all his life in Rijeka.

R. Whitehead took over the company management, very soon he formally entered in Board, and he started to expand and modernized the production. He gave the factory a new name «Stabilimento Tecnico di Fiume». He constructed and produced big steam engines for Austrian navy ships, in few years there were made almost 10 steam engines for ships from 250 to 800 nominal horse powers. Engines were fitted in Trieste shipyard; in that time Rijeka had not facilities for making such big navy ships. All of these ships, with engines from Rijeka, took part in the navy battle at Lissa island in 1866, and «Stabilimento tecnico» from Rijeka got very good reputation for excellent steam engines used on Austrian ships.

Torpedo is born

In same time, at the beginning of 1860, come back in Rijeka, to retire in his home town, Giovanni Biaggio Luppis⁷, who spent his entire successful career in Austrian navy. In Rijeka he tried to develop his idea to make some kind of "high technology" navy weapon, to sink ship from long distance by unmanned vessel. But financially and technically he was unable do to it by himself, so he asked help from R. Whitehead, manager of Rijeka »Stabilimento«. They made first written contract in august 1864 on development of Luppis idea. The Luppis vessel, he named it "coast saver" (salvacosta or küstenretter), in hands of experienced engineer as R. Whitehead, after two years of research and development became the first efficient torpedo, they called it "fish torpedo". Construction, development and manufacturing of torpedo prototype were helped by a factory technician Annibale Ploech, and Whitehead's son John.

The first torpedo testing was done in the sea in the Rijeka bay in front of factory on 20. December 1866. Torpedo was improved for two more years, and last tests before delivery were done in spring of 1868. from the gunboat «Gemse», she was adapted for underwater torpedo launching tubes, another R. Whitehead invention. The «Gemse» commander was a frigate lieutenant, graf Georg Hoyos, he later married Robert Whitehead daughter Alice, and became R. Whitehead partner and took part in managing the factory.

First few years the torpedoes from Rijeka's «Stabilimento» were named Luppis-Whitehead torpedoes, later models were simply Whitehead torpedoes, and this name was kept for all type of Rijeka's torpedo models almost a hundred years. Giovanni B. Luppis (Johannum, Ivan), the real initiator of torpedo invention, left Rijeka around 1870, he had nothing to do in further improvement of torpedo, he got money from the contract, and he moved in Torrigge, on lake Como in Italy. For his contribution in torpedo invention he received from Emperor Franz Jozef decorations and a noble title, Giovanni B. Luppis *von Rammer*. He died in Milano in 1875.

⁶ Edwyn Gray; Robert Whitehead – the English Engineer, Proceedings of the 1st International Conference on the occasion of 150th Anniversary of the Torpedo factory in Rijeka and the Preservation of the Industrial heritage in Rijeka, editor. Miljenko Smokvina, Rijeka 2005, page 85.

⁷ Irvin Lukežić, Riječki izumitelj torpeda Ivan Blaž (Giovanni Biaggio) Luppis de Rammer, Proceedings I. Conference, isto, str 49., Erwin Schatz; A short Biography of Captain G. B. Luppis Born in Rijeka 190 years ago, isto, str. 39.

The first torpedo customer became Austrian navy; they bought 4 torpedoes, and system for launching torpedoes for gunboat «Seehund». English navy followed, they bought torpedoes in February of 1871, and almost all other navies later, France 1872, Italy and Germany 1873, Denmark, Sweden, Norway 1875, Russia 1876, Turkey, Argentina, Belgium, Chile, Greece... in 1877, and so, United States very quite late buyer, they come in Rijeka to buy torpedoes in 1891⁸.

The old foundry, the «Stabilimento tecnico di Fiume» was converted to produce torpedoes and torpedo related equipment, launching tubes, compressors, gyroscopes, and so. In the first years of company life, the «Stabilimento» was commissioned for making iron steam ships, so they made the first steam ships in Croatia; «Hrvat», «Liburno», «Nixe»⁹, «and Unio», and few port auxiliary ships and boats. In that time, before entering completely in making torpedoes, «Stabilimento» had opened a joint venture shipyard on Danube in Budapest, there were build few passengers ships and in 1871/3 two Danube monitors «Leitha» and «Maros».

After some business difficulties, not sufficient orders, the «Stabilimento» went bankrupt in 1873, and R. Whitehead took it over at beginning of 1875. The factory was renamed "Torpedo Fabric von Robert Whitehead", and was transformed into a private company, later it was transformed into stock company «Whitehead & Co. ».

Development and testing of torpedoes

The first produced torpedoes in Rijeka were in concept quite similar to torpedoes up to modern times. Torpedoes was moving under water/sea, after the launching it was completely autonomous, the engine was run by compressed air, the depth was controlled by independent system of hydrostatic and stabilization devices (it was called secret chamber), the azimuth path was regulated by fins, and on the torpedo was mounted system of detonators, to activate explosive in contact with target. The launching of torpedo was done underwater by different systems of launching tubes. Almost everything was originally invented or developed in Rijeka for this new kind of navy weapon¹⁰.

Robert Whitehead and his team of engineers and constructors were permanently making new models of torpedoes, and each type had better technical performances. Each new torpedo was tested before delivery, it was launched without explosive from special launching station, and later was recovered from the sea, and if necessary, it was done some regulation on torpedo, tested again, and when everything on it was perfect it was ready to leave the factory.

Testing and launching of torpedoes in Rijeka was common think, in Rijeka started modern R&D (Research and Development), and the facility for testing was made in the factory almost from the first days. The challenging technology of producing torpedoes, making very sophisticated auxiliary equipment, launching tubes and compressors, asked for workers with very good qualification, and they were paid much better than other workers in Rijeka.

For better control of torpedo trajectory in Rijeka for first time on the world was successfully used the gyroscope. After few years of negotiating and testing, the invention of Lodovico

⁸ La storia del siluro, 1860-1936, Genova 1936, str. 26-27.

⁹ Brigitta Mader; ... from Warships to Achduke Ludwig Salvator Yacht Nixe, Proceedings..., isto str. 121.

¹⁰ Miljenko Smokvina; Riječki torpedo prvi svjetski torpedo, konstrukcija i ispitivanje, Zbornik Tehničkog fakulteta Rijeka, Rijeka 1993. str. 273-291.

Obry, the first gyroscope was installed in Rijeka torpedo and 1897¹¹, and this was and other technological contribution, which still today has tremendous impact. (navigation of ships, submarines, airplanes, rockets, space crafts, and so).

Rijeka torpedo factory was exporting hardware (torpedoes, launching tubes and compressors) and software (license for producing torpedoes). The first affiliate far making torpedoes abroad was opened in Weymouth, England in (1891), than in Newport, USA, (1892), in La Spezia, Italy (1907), in “Lessner and Obukoff, Russia (1910), in St. Tropez, France (1913), in Napoli, Italy (1914) and in Livorno, Italy (1934)¹².

After the death of R. Whitehead in 1905. the torpedo factory became English property, two English companies; Armstrong and Vickers have bought the company from the Whitehead and Hoyos family¹³. After I. World war and collapse of Austro-Hungarian monarchy, when Rijeka becomes part of Italy, the owners of the factory became family Orlando from Livorno in Italy¹⁴. In September of 1943. Italy had withdrawn from Rijeka and from torpedo factory, after that there was some small scale torpedo production, due the heavy Allied forces air raids on torpedo factory, it was almost all destroyed. After the war and integrating Rijeka in Yugoslavia, the factory was completely rebuilt and started to produce for military and civil purposes.

The torpedo factory in Rijeka produced almost 20.500 all types of torpedoes from 1866 to 1943. In same time from Rijeka was delivered more than 1000 launching tubes and 1400 compressors. There are not available statistics for torpedo production from 1943. until 1966, when the last torpedo in Rijeka was produced.

Beside torpedo production, in 1907 factory started to made submarines, the design was from Holland company in United States of American. Rijeka delivered in 1909/1910 two submarines to Austro-Hungarian navy, and several to Dutch navy¹⁵.

Factory life after abandoning torpedo production

The Rijeka torpedo factory produced torpedoes almost one hundred years, last torpedo production was discontinued around 1966, but factory lasted more than 150 years almost to today. After the Second World War, in the factory was started development and production of diesel engines, later factory made lorries, tractors, loaders and mechanical excavators. In the 1947. there was produced first diesel engine of 7-9 HP, it was called “Torpedo Motor” (Torpedo engine). In 1953 the name of the factory was changed in “Torpedo Engine Factory”, in same time there were two parallel production lines, one military, the torpedo production (and equipment), while the other was devoted to development of different kinds of diesel engines, vehicles, tractors. The military production every year was decreasing, and in around

¹¹ La storia del siluro, isto, str 115-117.

¹² Nikolaus A. Sifferlinger; Development of the Whitehead Torpedo in Rijeka and the Impact to the World Navies, Proceedings 1. Conference..., isto. str. 105.

¹³ Antonio Casali and Marina Cattaruzza; Sotto i mari del mondo, La Whitehead 1875-1990., Editori Laterza, Roma, 1990, str. 73.

¹⁴ Benito Petrucci; The «italian period» of the Whitehead Torpedo factory of Fiume (Rijeka)...., Proceedings 1.st. Conference..., isto str. 201.

¹⁵ Mihaly Kramli; The Whitehead Factory and the Orders of the Austro-Hungarian Navy, Especially the Whitehad Submarines 1904-1914., Proceedings 1.st. Conference ..., isto. str 135.

1966 the factory discontinued its military program. In 1975. started the production of air-cooled diesel engines in cooperation with the Deutz company from Köln. The production of different types of own constructions based on this type of engine, started in 1985, and the products were marketed worldwide. Very different types of vehicles for specific purposes were developed in 1990's.

In few last years, in times of Croatian transition and political changes, due numerous economy and marketing problems, the factory has undergone a crisis and gone bankrupt. In some factory halls it is again started some small scale repair, service and industrial production; there are plans to make in the part of ex torpedo factory wholesale fish market and in part of one hall some kind of center for new technologies. In last time almost all factory halls are sold, converted or abandoned, and all other facilities, machines, and tools where sold /machines/ for iron and steel scrap.

From the almost 1700 tons of tool machines which were sold for scrap, with the help of factory bankruptcy Board, it is preserved 5 tool machines, oldest, best and most valuable in terms of preserving industrial heritage of factory technology. On the premises of the factory it is preserved the compressor station, from the torpedo production time, but there is not clear what will happen with this preserved industrial artifacts, if will not any museum (or similar institution) take care of them.

Problems and ideas in solving Rijeka's torpedo factory industrial heritage

Torpedo factory in Rijeka was first factory on the world where torpedo was constructed, developed and produced. On the premises and near the factory, on the sea shore, from the first beginnings, all types of new torpedoes were systematically tested. For this reason almost from first times, on the factory sea shore always were some type of launching station, facility for launching and testing torpedoes

One of the last launching stations is still "in situ". It is a launching station from which was tested the last Rijeka's torpedo in 1966. This launching station was build after Second World War, on ruins of destroyed station build in 1930-ties. First launching station was build before 1880, second on beginning of 1900. All the time there was some kind of launching station for testing any types of torpedo produced in Rijeka. In the sea in Rijeka bay, part of the bay was reserved for torpedo testing, in the sea were anchored special kind of pontoons for observing path of launched torpedoes.

Today's launching station in Rijeka torpedo factory is listed in Croatian register of Monuments, as an industrial heritage monument, but beside it is in bad and ruined condition. In 1993. on occasion of celebration of 140. anniversary of beginning of "Metal foundry", it was proposed to make in the launching station the Museum of torpedo¹⁶. This idea is still alive, but until today, 14 years later, almost nothing seriously has happened in preserving torpedo launching station and making in it the Torpedo museum.

On today premises of ex torpedo (diesel, lorry) factory there is more than 81.000 square meters in factory halls and open spaces, there are many ideas how to use this valuable space

¹⁶ Miljenko Smokvina; Proposal for the Restoration of the Torpedo Museum Collection in Rijeka (protection and restoration of the industrial archeology heritage in Rijeka, Rijeka, August 1993.

on the Rijeka city sea front, process of making City development plan is still in progress, so it is a chance that this space will be reused or redeveloped preserving this important industrial heritage site.

How to protect and reuse Rijeka torpedo factory industrial heritage

Rijeka is historically one of the most important industrial cities in this part of Europe. Citizens in Rijeka are very aware of Rijeka industry and its industrial heritage¹⁷. Few years ago in Rijeka it is organized first Croatian citizen society for promoting and protecting industrial heritage. Its name is "PRO TORPEDO", goals is to arouse perception of value of all kinds of industrial heritage in Rijeka and in Croatia, to start actions in preserving heritage in danger, and one of its target (among other sites of industrial heritage is Rijeka) is to protect and find some kind of reuse (as a Museum or something similar) of torpedo factory industrial heritage in Rijeka¹⁸.

Protecting heritage of torpedo factory is very important for Rijeka and its citizens. It is unnecessary to emphasize the admiration for the technical features of the Rijeka invention – torpedo. This invention of global proportions, the elaboration of the concept by a Rijeka native, the production of torpedoes in Rijeka, the significance of the plant for Rijeka, and its existence to these days, all provide sufficient reasons for these events to be recorded in the form of a permanent museum collection¹⁹.

In many places around world, in Maritime and Navy Museums and/or in ex torpedo factories, there is some kind of protecting torpedo heritage, most of this heritage is directly connected with invention and production of Rijeka's torpedo.

We can find the Rijeka's torpedo heritage in many places around world, just to mention few places.

War museum in Wien in Austria is in possession of first "Küstenretter" the first model of G.B. Luppis rough idea of "torpedo", there are few models of the first Rijeka torpedoes, and other "Whitehead" torpedoes. In the Maritime museum in Split in Croatia, there is a collection of first prototypes and working torpedoes, which come there in mid 1960, from Rijeka's torpedo factory Museum. In Rijeka Maritime museum there is collection of first torpedo gyroscopes, torpedo launching tubes. In Technical museum in Zagreb is displayed one example of torpedo produced in Rijeka after the II. World war, similar torpedo is on display in Maritime faculty in Rijeka. In Budapest in Hungary it is preserved the first Danube monitor "Leitha", which was build in Budapest 1871/2 by Rijeka torpedo factory. In Livorno, in Italy, where is still today alive torpedo factory named WASS, which have been started by Rijeka torpedo factory in 1934; they have plans to make their own Torpedo museum, with roots in Rijeka historical torpedo invention. In many technical museums there are collections of historical torpedoes, like Deutches Museum in Munich²⁰, in many other places like in France

¹⁷ Miljenko Smokvina, Daina Glavočić, Julija Lozzi Barković, Otvorena vrata riječke industrijske baštine, Pro Torpedo Rijeka, Rijeka 2004.

¹⁸ Miljenko Smokvina; Industrijska baština tvornice torpeda u Rijeci, Informatica Museologica 33 (3-4) 2002., Muzejski dokumentacijski centar, Zagreb, str. 80-87.

¹⁹ Miljenko Smokvina; Proposal for the Restoration..., Rijeka 1993.

²⁰ Jobst Broelman; Early Torpedoes and their Conservation in the Detsches Museum, Munich, Proceedings 1.st. Conference..., isto, str. 187.

(St. Tropez), England (Goosport, Woolwich and Weymouth), Italy (La Spezia, Napoli), United States of America (Alexandria, Washington), they are protecting torpedo heritage too. And there are many other known and unknown places where is preserved torpedo memory²¹. in some way.

From all this places can be made a common world virtual torpedo Museum, it can be made as network museum, which is connected by torpedo invention, its history and technology, development from beginning until today. Any of this already existing torpedo museums (or torpedo collections), or future torpedo museum, can be connected by common museum ticket and information about other museums. Museums can exchange exhibitions, exhibits, have common web sites, publish books on torpedo and related technologies, exchange custodians and so. We believe that such virtual museum can be coordinated from Rijeka, the place where the torpedo started his life.

Any way it should be find solution to protect Rijeka's torpedo historical heritage, and most urgent is to find way to protect torpedo launching station in Rijeka to convert it in Museum.

Archives of torpedo factory

Discussions among experts, cultural and heritage enthusiasts, common citizen and people who make decisions how to protect industrial heritage are alive all around world. There is not easy and cheap way to do it anywhere, so it is the same problem in protecting the heritage in Rijeka, too.

If the site is alive, and the are signs that the in place will stop the production activity, and is going to turn in industrial heritage, the best way is to protect full place, all premises, (landscape include), halls, houses, facilities, machines, tools, final products, semi final product, raw material. It is absolutely clear that is not possible to protect in a such way all places, there is always need for reuse of abandoned places, in cities it is a permanent process of urban regeneration, so it must be find the best compromise in preservation and development, but it is much easier to say than to do.

Heritage of historical technology is in danger too, intangible heritage of production, of skill, of workers memory it disappearing too, so same problems, as with tangible heritage is even worse than with “software” of industry.

Preserving factory archives is another problem. There are not many sources to investigate in general what is happening with archives of factories which are going to close and to disappear. I am afraid; the archives are disappearing even faster than its creators. Opposite of common opinion, industrial archives are not most protected source for research and many archives are already ceased to exist. Maybe it is problem in countries in transition, as Croatia or similar places, to many factories in same time in bankruptcy, and even more archives to protect, and no enough sources to do it, and no agreement how to do it, who mast take care of them, where to put them, and so, and so.

Problems with technical archives and business too, in Rijeka torpedo factory are the same. In its 150 years of history many items have disappeared, the factory was all the time on same

²¹ Miljenko Smokvina; Što učiniti s industrijskom baštinom riječkog torpeda, novi Kamov, br 3. 2003., str. 62-79

place, in west part of Rijeka, but the countries in which it where existing were changed few times, an it was a problem for its archives. Factory started in Austria monarchy, than this part became Austro-Hungarian Monarchy, and it lasted until end of I. World war. Location of the factory than became Italy, it was until end of II. World war, when Rijeka and factory came in Yugoslavia. After the dissolving of Yugoslavia in 1991, this space became Croatia.

What was, and still is, the problem with torpedo factory archives. We are today missing the earliest documents of first days of factory and of the process of inventing and developing the torpedo. Even the first historians of torpedo invention in 1880, were not able to get information from Robert Whitehead or the proper description and drawings²². So today we try to reconstruct the history of torpedo by getting any part of the puzzle, and we hope we are not missing too many pieces to form a complete picture.

One of the important parts of torpedo history on the paper is quite well preserved in Stats Archive in its Kriegsarchiv in Wien. There are all documents related to first torpedo testing in Rijeka 1866-1868, and all drawings and related papers about torpedoes and torpedo boats which was bought by Austro-Hungarian navy. In other Wien Museums like War museum and Technical museum are some documents and pictures from the same era on Rijeka torpedo factory, same is in Hungary in Budapest museums, there are some documents in Military museum and in Transport museum.

From the “English era” of Rijeka torpedo factory (after the death of R. Whitehead until Italian acquisition of factory in 1924.) there is very few information on that time archives, it was a typical private military industry and very few information were made public.

From “Italian era”, from after I. World war until 1943. here in Rijeka there are very few documents. But in WASS, Livorno torpedo factory in Italy, established in 1934 by Rijeka factory, which is still alive and in torpedo business as well, there is considerable amount of documents (almost 10.000 pictures, drawings, business papers and so). After the evacuation from Rijeka and torpedo factory, the owners of it have taken to Italy almost all documentation from the “Italian era”, and from beginnings of producing torpedoes in Rijeka. The WASS is military factory too, not very open to public, and so even their historical document related to history of Rijeka torpedo factory are not very open to researcher of Rijeka industrial heritage. The WASS in Livorno had some ideas to make on their premises some kind of torpedo museum, with roots in Rijeka torpedo invention, so it is a chance that in a case, their archive will be more open.

From the Yugoslav time of torpedo production from after the II. World war until 1966, there are very few official information and documents too. The same military “secret” on torpedo production and related documents prohibited any industrial heritage research. The main dates of torpedo production are still in Beograd, (now Srbija, and then Yugoslavia); opening of their military historical archives will solve the lack of that time torpedo information.

The State archive in Rijeka does have some official documentation on Rijeka torpedo factory from first days until today. There are some “Fonderia metallic” first documents, papers from “Stabilimento tecnico di Fiume” and “Torpedo fabrik von Robert Whitehead”. These documents, all together not very many, are quite important for the life of torpedo factory, but most of the are not related to technology or business part of factory life, so we here in Rijeka

²² Miljenko Smokvina; Riječki torpedo..., Rijeka, 1993, prema Sleeman C.W., Torpedoes and Torpedo Warfare, Portsmouth 188.

are lacking some proper documentation and information strictly related to this part of its industrial heritage.

Fortunately some documents are preserved, and are now properly stored in State archive in Rijeka. In 1993. on occasion of 140 anniversary of torpedo factory, one man, Claudio Sever, ex torpedo factory specialist, who was helping on preparation the torpedo exhibition, had made public that he had preserved by his personal initiative, the very valuable torpedo documentation. When he got order (in 1966) to through away “unnecessary” torpedo documentation, because factory is not producing torpedoes any more, he put that documentation in one room in than abandoned launching station. The documentation was pulled out on the light of day, and part of it was put on display on the torpedo exhibition. Later all this documentation was moved in the States archive in Rijeka, and is properly and professionally preserved and catalogued. Two expert archive persons worked almost two years on that job, and now we have in Rijeka around 72 meters of torpedo documentation (catalogue No: PO-37 , 734).

An other technical archive from later time of the diesel and lorry production was in peril too. After the bankruptcy of “Torpedo motori” factory, there were (still is) problem what to do with remaining technical documentation of that time of factory life. After some negotiating, it was the chance that all this paper will finish as waste paper, all this documentation (around 150 cubic meters) is now in the premises of the Society PRO TORPEDO Rijeka. It is still uncategorized, uncatalogized, just preserved to be under roof in safe place, waiting better times.

Conclusion

Industrial heritage of torpedo factory in Rijeka is not only important for Rijeka, or Croatia, it is valuable part of world cultural and technological heritage. Problems of preserving such valuable heritage is some places is not a small task, and only common international efforts can find solution, and I hope (and believe) it will happen here in Rijeka.