Shipping Databases, the case of Lloyd's Register of Shipping

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Supervisor Dr. David Bawden
Abstract

This project is aimed at the Library and Information Science field, with the purpose of discussing industrial databases, more specifically shipping and shipbuilding databases. This project is focused mainly on the Lloyd’s Register of Shipping. We will start by discussing the historical basis which enabled the establishment of such a database, why it was created and what purpose it had in the field of shipping and what was the role it played in the shipbuilding industry. In this part we will look at the developments of the shipping from the medieval time to the time when the Lloyd’s Register was created by the London underwriters during 1760. From there we will pick up by looking at the early history of the register and why at the end of the eighteenth century a rival register was created by the shipowners. We also look how the two registers slowly began to decline and how finally they reformed themselves into the current register in the year of 1834. The next part of the project will be concerned with the nineteenth century shipbuilding developments and how the Lloyd’s Register responded to them. We will look at the transition from wood to iron and then from iron to steel. In both cases the Lloyd’s Register of Shipping developed sets of rules to govern how ships of iron and steel should be built, alongside the rules it has established for building of wooden vessels. We will also touch upon the transition from sail and wind power to steam power. This part will include description of the different steam turbines and engines and how they transitioned at the end of the nineteenth century to internal combustion engines. The last part would be the history of the register during the twentieth century. Finally, we will look at the how the register looked at the problem of big data and how to do shipbuilding research. The main method utilised for this work is desk research, however, the two most important types of desk research would be literature and historical reviews. The main finding in this research is that industrial databases are essential in any historical research, without them any historical research would be extremely difficult to conduct, making it a slow and tedious process.
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Shipping Databases, the case of Lloyd’s Register of Shipping

The reasons a ship is called 'She'
There is always a great deal of bustle about her, there is usually a gang of men around her, she has waists and stays, she takes a lot of paint to keep her looking good, she knows her topside, hides her bottom, and when coming into port always heads for the buoys.

Sir John Martin
Lieutenant Governor of Guernsey

Introduction

This project is aimed at the Information Science aspect of the shipbuilding industry, specifically the databases that cover this industrial sector, such as Lloyd’s Register of Shipping and British Shipbuilding Database. In order to understand why there is such a great need to examine the topic of the shipbuilding and shipping database, we can provide an example from a 1766 court case. The purpose of the Register Book was summed succinctly in there, in the words of Nigel Watson. In those proceeding was reported “…how underwriters 'keep a Register in which all ships insured by them are entered, with an account of age, construction and visible goodness of the vessels, and to where they belonged.'” This is a prime example of the importance of these register societies, and particularly that of the Lloyd's Register, not only they provided relevant information for the shipping business at the time, they provide a valuable historical records of the shipbuilding industry and shipping business. We can go as far as arguing they could be used also as source for local or family history as they provide records of ship names, they dates of build and their class, and as far as the family knows the name in which their relative served they can find the relative records with ease in the Lloyd’s Register of Shipping records.

In this section also a description of the methodology would be included in order the reader to understand better the process of research for this topic. The first part of this dissertation would be examination of the prehistory of the shipping lists and the creation and the early years of the Lloyd's Register of Shipping. Then in the next part we will look at how the Shipping Register developed through the nineteenth century to keep up with big changes occurring in the shipbuilding industry and the global shipping business. In the next part of this project we will look at the twentieth century. The third part of the project would be devoted to the current development of the Lloyds Register of Shipping. As a conclusion, we will take a look at how to do shipbuilding research with the help of shipbuilding databases, such as Lloyd’s Register and British Shipbuilding Databases (BSD in short), and finally we will take a look what Register books are preserved in the Lloyds Register archives, as the register has a far ranging history which goes back at least few centuries. Appendix A of this project is devoted to short glossary of the terms that would be used in the essay, as the author is certain that this will greatly enhance the understanding of the topic at hand.

To understand better the Lloyd’s Register of Shipping or any other shipping register, we need to look at all the aspects of the industry, from the shipyard layout to the business side of the maritime shipping industry. This would allow us to grasp the changes that occurred in the register with greater understanding, if we have just looked at the register without paying attention to what was going on in the industry at that period. This approach is valid for any other project or question, to understand the question, you need to have an understanding of the developments around the problem you are looking at. If, we are true to this statement even the political background surrounding the shipbuilding industry should be examined, as it dictates the rises and falls in the industry.

1 Glossary of Marine Terms, Special Edition for Members of the Institute of Marine Engineers (Heinemann, London, 1980) p. III.
2 Nigel Watson; Lloyd’s Register, 250 years of service (Lloyd’s Register, 71 Fenchurch Street, London, 2010) p. 94.
This project will utilise the research method, or methodology, called ‘Desk Research’, which basically means going through a lot of secondary literature, i.e. written by researchers, who examined the topic, also looking at archival materials, which are the main sources of information and are supported by the secondary materials. The main core of the project arguments would be made up of information found in archives and archival materials that are confirmed to be relevant to the topic, then as a supportive statement information found in the secondary sources would be employed to strengthen the points.

To better understand what a desk research method is and why it was chosen for this particular project we will give a short description of it. As David Bawden and Lyn Robinson write ‘desk research’ encompasses the many forms of research that use some type of document analysis. This is also to see what was written before and to identify the relevant information sources needed for the research and the project. “It may provide the methods for studies in their own right, which are just as much valid research as any other, in as much as they have the potential to provide new knowledge and insights. Such studies will themselves be preceded by a literature review.”³ The authors distinguish several types of desk research that are in existence, those are: literature review, meta-analysis or meta-synthesis, conceptual or philosophical analysis, historical analysis, content analysis, discourse analysis and bibliometrics. In this project the main types of desk research are literature and historical reviews. The literature review as Bawden and Robinson argue is the most widely used form of desk research and could pull of a study of subject on its own, or it could be used as a prelude to other desk research approaches. “They may be designated as comprehensive or selective, according to whether an attempt is made to cover all relevant material or only a subset which the reviewer finds significant.”⁴ There is also the systematic review, that carefully defines and justifies the sources, the relevance criteria or search strategy before the material is found or identified. “A review may be objective, in simply reporting what is in the literature, or subjective, in that the reviewer gives a judgement on the quality of the material and its content; the latter may be called a critical review.”⁵ The literature review presented and done in this project would be mostly objective as concerned to the secondary sources found on the topic of the shipbuilding databases, however, as it comes to the primary source; i.e. the Lloyd’s Registers Annual Reports or the Register Books, the review may take a liberty in commenting on the sources and their quality. The final part of this project that deals with the twenty-first century developments in the Lloyd’s Register Foundation, may be considered a technology assessment as the review would be focused on the new technological developments, especially the big data concept, which plays a very important role in any field nowadays. The sections on the emergence of the Lloyd’s Register and its history would be considered a historical analysis, because they would be viewed as description of an information institution.⁶ Furthermore, these sections provide analysis on the development of information services and systems in the shipbuilding industry, starting from the underwriting and marine insurance business to how the shipbuilding manufacturing industry works.

The three most important sources for this project are the both editions of Annals of Lloyd’s Register respectively from 1884 and 1934 and the third being Lloyd’s Register, 250 years of Service. Another important source is the Annual Reports of the Lloyd’s Register, as they give us knowledge of the society’s operations year to year, although staying through to the fact we must admit that there are periods in which no Annual Reports were published.

However, before we move any further into the topic, it is perhaps better to clarify the types of shipbuilding enterprises that exist. Those come in two separate groups, the first distinct group are those who engage only in shipbuilding, plus maybe some of its supporting trades, like marine engine constructions, the second group is consisting of those who engage in multiple enterprise and shipbuilding is only a part of their much larger portfolio. However, those two distinctions are not the only ones, there are these companies that are

⁴ Ibid., p. 316.
⁵ Ibid., p. 316.
⁶ Ibid., p. 317.
private enterprises (limited liability family, or public-subscribing stock enterprises)\textsuperscript{7} and those which are state corporations and owned by the government. “There are strengths and drawbacks associated with each of these forms of organisation: so much so that they are frequently all found within a national shipbuilding industry.”\textsuperscript{8}

No serious researcher of shipbuilding can claim that, without understanding shipyard organisation, one can explain the shipbuilding industry. The shipyard, itself, is a whole another aspect of the industry and its management. The layout of the shipyards has changed drastically in the last few centuries, from a simple river or shore bank slipway to a big manufacturing plant with few berths and numerous facilities for construction and assemblage. This is dictated mostly by the change in the material used in hull construction and the increased sophistication of propulsion systems.\textsuperscript{9}

To understand better the shipbuilding, it is necessary to look into the financial aspect of every stage of the ship construction, right down to the first brick laid at new shipyards to the last weld or rivet added to a ship. This will also help us understand how the Lloyd’s Register works and other such ship classification societies. One of the main costs drains in the shipbuilding industry is creating a shipyard, Todd writes that costs for establishing a major shipyard in the USA during the 1970s, was estimated to be in the range of $100 to $200 million.\textsuperscript{10}

At the time of publishing ‘The World Shipbuilding Industry’ during 1985, the modern shipyards were turning into plants which specialised in modular construction and pre-outfitting. “The first term refers to the “efficient flow of materials to construct large sections or assemblies of ships in panel lines, joining these to form modules or blocks, and then joining the modules to form the completed hull.” Pre-outfitting meanwhile, refers to the installation of components into the module, such as pipes, cables and ventilation equipment, prior to working the assemblies into the hull…”\textsuperscript{11} according to Todd.

\textbf{PART I

Initial Developments up to the mid-XVIII\textsuperscript{th} century; The start of the register; XIX\textsuperscript{th} century; Industrial Organisation

The classification of ships formative period is obscured in fog. The historical records point out the mid-eighteenth century as the time when the first attempt was made at creating something resembling organised register, however, we can put forward an argument that over the preceding years some form classification for merchant shipping existed in a less organised form; “…if, indeed, it was not contemporaneous with the business of Marine Insurance.”\textsuperscript{12} To explain better, why a shipping register is needed, we need to look at the problem of Marine Insurance, as the Centenary Edition of Annals of Lloyd’s Register points out. As with the origins of the shipping classification, the origins of marine insurance are also obscured by the passage of time. “The Phoenicians, the Greeks, the Rhodians and other ancient peoples, were all, we are told, in the habit of guarding themselves against some of the risks of maritime enterprise by various systems of insurance, whether by means of loans or of mutual guarantees. “Nautical Insurance,” as Gibbon terms it, was so common with the Romans that it was made the subject of a special provision in one of the Justinian Edicts, dated A.D. 533, which, whilst restricting the legal rate of common usury to 6 per cent., conceded an increase to 12 per cent. in favour of this “perilous adventure.”\textsuperscript{13}

Conversion of merchant vessels to military vessels is no new concept was Richard Osborne argues, he writes that from the earliest records merchant vessels had been modified for military service, furthermore the construction differences between merchant and war vessels were not that big, with the notable

\textsuperscript{7} Daniel Todd; The World Shipbuilding Industry (Croom Helm, London, 1985) p. 38.
\textsuperscript{8} Ibid., p. 38.
\textsuperscript{9} Ibid., p. 28.
\textsuperscript{10} Ibid., pp. 98-99.
\textsuperscript{11} Ibid., p. 34.
\textsuperscript{12} Annals of Lloyd’s Register, Centenary Edition, 1934 (Lloyd’s Register of Shipping, 71 Fenchurch Street; London; 1934) p. 3.
\textsuperscript{13} Ibid., p. 3.
exception of specialised rams in the bows of some military vessels. “However, by the late 16th century, there was a clear distinction between the two, with warships being constructed for speed and manoeuvrability, and armed with broadside guns.”14 The merchant ships, however, were not built with the same specifications in mind and were generally slower and less sturdy in their construction, but were still able to be converted into ships of war and the result more often than not was an effective military vessel. This was a situation that was the general rule until the 1850s when new technological advances made the separation of those two classes too great to be overcome by simple conversions.

We can trace the immediate history of Lloyd’s Register to an advertisement from 18th February 1688, which was published in the London Gazette about Lloyd’s Coffee-house, which was owned by Mr. Edward Lloyd and was situated initially on Tower Street, and then move to Lombard Street, near the corner of Aachurch Lane in 1691.15 Historians believe that some of the early clientele of the establishment kept “Ships’ Lists” for their own reference. From this we can see a pattern establishing. Edward Lloyd’s specialised in shipping intelligence in support of his ever-growing clientele. In September of 1696, he started a newsletter publication called Lloyd’s News, he issued it three times per week, however, it was soon stopped in February of 1697, just under a year after its initial publication, after “…the Government having taken some exception to some trifling allusions to the proceedings of the House of Lords.”16 However, this publicity did not harm the business of the Coffee-house whatsoever. Further twenty years, where needed for the Lloyd’s Coffee-house to become a centre for the underwriter. But, by this time Edward Lloyd was no longer alive.

The roots of Lloyd’s Register of Shipping, which came into public existence in 1760, were alluded in the above-mentioned Ships’ Lists, this Society became the first English Classification Society and can boast the title of forerunner of all other Shipping Registries around the Globe.17 By 1781, there were 23 ports that were surveyed, this we can see from the oldest surviving list of abbreviations, furthermore, it is stated in the Annals of Lloyd’s Register from 1934 that 15 ports were under survey, after careful examination of the register book dated 1764-65-66.18 Those ports were London, Liverpool, Hull, Leith, Poole, Cowes, Topsham, Whitehaven, Exeter, Lynn, Teignmouth, Weymouth, Yarmouth, Portsmouth and Star Cross.19 Their importance was shown by the number of surveys carried out. As for the committee of the Lloyd’s Register at the time of 1797-98 when their names first appear in the book, there were eleven members. “It is not clear whether the Committee were elected by, and were directly responsible to, the Members or Subscribers, or whether vacancies as they arose were filled up by the Committee from the body of Members. It seems most probable that the Committee were formed prior to the institution of the Registry in 1760, and that they exercised the power of filling up vacancies in their own body.”20

The nineteenth century, saw monumental changes in the technology of building ships and in the science that allowed for new models of propulsion. The century saw things in maritime shipping that were never imagined or possible in the previous ages. The regular speeds that the ships could achieve by the end of the century were such that the maritime shipping business began to expand in ways not possible before. The shipwrights gave way to the new social group of ship manufacturers and the slipway gave way to the shipyard, a massive complex of several slipways and the adjoining workshops for fabricating and assembling ship parts and in the most advance cases to fabricating all the things a vessel needed from the steel plates to furniture. The sail began to be replaced by a steam engine with increasing power fuelled by coal and then the steam engine was replaced by internal combustion engines on diesel and petrol fuel. However, all those

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14 (ed.) Richard Osborne; Conversion for War (World, Ship Society, Monograph no. 6, Kendal) p. 4.
15 Annals of Lloyd’s Register, Centenary Edition, 1934 (Lloyd’s Register of Shipping, 71 Fenchurch Street; London; 1934) p. 5.
16 Ibid., p. 5.
17 Ibid., p. 6.
18 Ibid., p. 18.
19 Ibid., p. 18.
20 Ibid., p. 19.
changes did not arrive instantly, it was a slow gradual process, which began in unrest in the second half of the century and by the end of the century the shipbuilding industry was transformed completely and was unrecognisable for a person born in the late or early nineteenth century. Those statements are supported by the Pollard and Robertson who write that in period from 1860 to 1914 the value of the global commerce rose by some 400%, and that between 1870 and 1910 the United Kingdom’s foreign trade doubled in value and even more in bulk.21

Around the turn of the nineteenth century a change in the ship classification scheme occurred, however, not all ship-owners, merchants and underwriters agreed with this change. That is why some of them decided to create a new register book. This occurred in the period 1803/04. “founded in error, and calculated to mislead the judgement of merchants and underwriters; and, if continued, would not only prove of the most injurious consequences to individual ship-owners, merchants and underwriters, but to every branch of trade connected with repairing and refitting vessels; and, in a great measure, tend to destroy the shipping of the country.”22 That is how a large body of ship-owners, who disagreed with the changes, expressed their feelings in a rather harsh manner. Furthermore, similar meetings happened in all major ports of the country and similar statements were issued. A committee was appointed by the ship-owners from London to have an interview with the authors of the new plan, however, this committee appointment was refused, and left with no other choice, those ship-owners had to raise funds and publish a new register book. The new register book would, according to them, return to “…principles so long established and universally approved…”23

This development led to a splinter group occurring and the new register book started to be printed at a different location. The new printer house became J. H. Hart, and the published was ‘A Society of Merchants, Ship-owner and Under-writers’. The most preserved collection of these Register Books can be found in Newcastle at the Discovery Museum archive collection.24 From the explanation given for the schism with Lloyd’s Register we can deduce that the issue most probably arose sometime during the year 1802.25 We can also deduce from the latter passage that the issue arose between the underwriters and the shipowners, and that the shipowners were the ones who instigated this new register.26 Nigel Watson writes that the original Register Book, or also known as the Green Book, was being referred as the Lloyd’s Register Book of Shipping since the period from 1802 by the underwriters in the city of Liverpool, however this title has not been in official use until two decades later, in 1829. However, as stated above and also corroborated by Watson, due to dissent over the system of classification two register books began to be published. One was by the shipowners known as the ‘Red Book’ and the other by the underwriters which was respectively known as the ‘Green Book’. “This rivalry lasted from 1799 until 1833.”27 However, let us give some background to this rivalry. By 1797, the Register was run by 11 members which were part of the so-called organising committee and the subscription was totalling at 215. The organising committee was chaired by a well-known underwriter John Julius Angerstein. “The committee clearly concluded that the existing classification system required change. Members were sceptical of the quality of construction and materials used at the shipbuilding yards growing rapidly in northern ports, which were already building 40 per cent of the country’s ships.”28 The decision that they reached was that in the future the class of the ship would be determined by the place of construction and the respective age of the vessel. Thus, the ships built along the Thames, where large number of the most prominent shipyards were located, remained in class for the same period as vessels built in any other port in the country. However,

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23 Ibid., p. 8b.
24 Ibid., p. 7.
25 Ibid., p. 8b.
26 Ibid., p. 12.
this solution was problematic, as it was too broad for this limited issue and this change was imposed too quickly, without transitional period, enraged many of the subscribers, writes Watson. This was even more acute since the committee did not carry out any prior consultations. The unhappiness may have been great amongst the protesting party however; the idea of the Register Book was too good to be abandoned. “They placed such a value on the information it contained – it was, they said, ‘a Book of Authority’ – that instead they started their own. Forming a group which they called the Society of Merchants, Shipowners and Underwriters, based in Old Broad Street in the City, they issued the New Register Book of Shipping in 1799.”

Their dissatisfaction with the Lloyd’s Register was so great that four years later, in 1804, they still gave account of this rift in their preface to the annual Register Book, as is shown in the paragraphs above. One of the members of the governing committee of this new group became Robert Curling, who was believed to be the founder of the London General Shipowners’ Society.

The question of the rival registers was also touched upon in the Annals of Lloyd’s Register edition from 1884. There it is argued that the concurrent existence of two be unproductive. The amalgamation of the two the registers was suggested by the General Shipowners’ Society, at the start of the nineteenth century, however, this led to nowhere. The dissatisfaction was widespread and was gaining momentum yearly, that lead to succession of public meeting attended and held by merchant and shipowners during 1823. During these meetings a notion that the two registers “…had fallen largely into disrepute, and were travelling slowly to financial ruin.” An extract from one of these meetings provided from a speech by Mr. Marshall would be provided in Appendix C, Paragraph I. Mr. Marshall was an advocate of radical changes in the administration and the organisation of the Register Societies. He further argued, that the governing Committee must be made up from representatives of the underwriters, shipowners and merchants, not by gentlemen from only one class, who according to him were self-elected and irresponsible.

All of these was happening on the background of a war with Napoleonic France. As Nigel Watson writes the opportunities of that time benefited the British merchant navy and it double its tonnage from 1.2 million gross tonnage in 1792 to 2.6 million tons two decades later, in 1815 at the end of the war. “The two Register Books gained nothing from this expansion.”

In the ‘Annals of Lloyds Register’ from 1884 the point of establishing the exact constitutions and practical workings of the Register from 1760 in absence of complete records from that period is argued. However, from the trusted sources available to the writers it is established that the creation of the Register was supported by the Underwriters, “…for their sole use “Members of the Society”, as the Subscribers were then termed…”. Furthermore, the principal revenue sources of the Society was the subscriptions. Rules were adopted to limit the use of the Register to only the Members, these rules were followed and enforced strictly. “Each Subscriber at the end of the year was obliged to deliver up his old book before a new one was issued to him, and at one time, if a book was lost or stolen, the person to whom it belonged was refused another, although willing to pay for it.”

A set of rules was adopted around April 1799 by the Committee of the New-Register Book of Shipping. However, due to a lack of records, we are not sure what was the previous set of rules, that was replaced. The problem lies in the fact that the first Lloyd’s Register Book, that is on hold in the Tyne & Wear archives located in the Discovery Museum in Newcastle, is dated 1804 and the rules section in this book is dated 2nd

29 Nigel Watson; Lloyd’s Register, 250 years of service (Lloyd’s Register; 71 Fenchurch Street, London, 2010) p. 13.
31 Annals of Lloyd’s Register, being a Sketch of the Origin, Constitution and Progress of Lloyd’s Register of British & Foreign Shipping, 1884 (Lloyd’s Register of Shipping, 2 White Lion Court, London, 1884) p. 20.
32 Ibid., p. 29.
33 Ibid., p. 30.
34 Ibid., p. 30.
35 Nigel Watson; Lloyd’s Register, 250 years of service (Lloyd’s Register; 71 Fenchurch Street, London, 2010) p. 13.
36 Annals of Lloyd’s Register, being a Sketch of the Origin, Constitution and Progress of Lloyd’s Register of British & Foreign Shipping, 1884 (Lloyd’s Register of Shipping, 2 White Lion Court, London, 1884) p. 10.
37 Ibid., p. 10.
April 1799. 38 These rules distinguish several ship classes. The classes are marked A, E, I and O. The first class are the so-called river build ships which are constructed entirely out of British materials, which are no older than twelve years. The second section in this class is country build ships no older than ten years. This class includes ships build in Bermuda and the America, also the Southern Colonies, French, Spanish, Portuguese, Mediterranean, Dutch and all other Northern Nations. This class is quite broad and includes many nations located in several different continents. The class also includes British build ship no older than eight years if build with a mixture of inferior foreign timber. The Second Class, also E, are all ships which are in good condition and appear in the Register and also are safe to carry dry cargo. The third class is for ships which are in need of repair and do not seem safe to carry dry cargo during a survey but are still seaworthy and able to carry goods that are not liable to be sea damaged. The fourth class is for ship that are under maintained and are not sea-worthy and suitable for foreign shipping. 39

By the 1834 the Green and Red Registers were merged into one. The system which was adopted by the Committee of the Red Book for classification was based on upon the age and place of build of ship, however not the extent of the Green Book. “Under the regulations of both Societies, a vessel, upon the expiration of her original class, lapsed to an inferior grade, and no amount of repairs or strengthening would enable her to regain the A1 character; while in neither case were there any Rules for the construction and systematic survey of vessels, and the Surveyors were practically uncontrolled in their decisions.” 40 As is argued in the Annals of Lloyd’s Register from 1934, both systems were unreliable and both registers generated hostility in large parts of the shipping community. 41

In 1828-29 register book a statement was published that described the financial troubles that were occurring in these societies, you can find the full text of this statement in Appendix D, Paragraph I. 42 In 1833, the two registers were in such a desperate financial state, that it was expected they would go bankrupt in one or two years. The Underwriters subscriptions have contracted to only 163 subscribers with available funds of little more than £1,000 and the Shipowners register was even worse with only 75 subscribers in total. “The “Special Committee on the Affairs of Lloyd’s,” fearing that under these circumstances the community might be left without a Book, and with the object of rendering the inspection of shipping more efficient, appointed a Sub-Committee to confer with the Committees of the two bodies, and endeavour to effect a union between them.” 43 A meeting was held in the Merchant Seamen’s Office on 14th August 1833. At that meeting a decision was reached that the two register should join together in order to produce one efficient register. 44 “Mr Sadler, writing at the same date to Mr. Lancaster, Chairman of the Red Book, on behalf of the Special Committee on the Affairs of Lloyd’s, expressed the earnest hope that he would, in conjunction with the Committee of the other Book, take early measures for carrying into effect a resolution which appeared to the shipping and commercial interest of the country.” 45 On the meeting held at the River Dee office located over the Royal Exchange at 10th of October 1833, no opposition was presented to the decision of the two registers to be merged together. Also, there it was decided that the members of the two Book Committees should form one Joint Committee which carry out the joining of the books. Re-drafter Rules were adopted on the 17th January 1834 and published as a “Prospectus of the Plan for the Establishment of a New Register Book of British and Foreign Shipping” during a meeting of the joint committee. 46

38 9/7; 3.6, 34-6 & 37-6; Shipping Register 1804 (A-D), The New Register-Book of Shipping for the Year 1804, By a Society of Merchants, Ship-Owners, and Under-writers (J. H. Hart, London, 1804, Sixth Edition) p. 9b.

39 Ibid., p. 9a/F.


41 Ibid., p. 26.

42 Ibid., p. 46.

43 Ibid., p. 46.

44 Ibid., p. 47.


By the mid-century tensions in the North America ran high, with the rural slave owning southern states of America in increased odds with the urban industrialised northern states. Those tensions led to the conflict known as the Civil War of 1861-1865. The reader may be wondering how this is connect with Lloyd’s Register of Shipping or at all with the history of shipbuilding. However, we just need to think of the cotton trade and to remember that there was no industrial base in the southern state. This will lead us to examine who needed the cotton, mainly it has been exported to Europe (France and Britain) and what the lack of industry meant for the southern states in war with the north, this will further lead us to remember that the northern states quickly imposed a blockade on all major southern ports. Eric J. Graham, confirms this by claiming: "The Southern states had started a war wholly lacking an industrial base from which to sustain a prolonged conflict or with which to build a navy rival that of the North."47 Graham also argues that the Southern States, or the Confederacy as they became known, were gambling on “…series of quick land victories…” and “unshakable belief that Britain and France would be sucked into the war. Their grand navies would soon break the blockade in their desperate need to reopen the flow of cotton to Europe.”48

The Confederate Navy ships were few and far between, it consisted of two armed raiders and ensemble of river gunboats and foreign steamers. “The pride of the navy was salvaged old wooden Union warships and large steamers crudely converted to serve as ironclads. The best were iron-plated but most were simply sheathed with strips of railway track.”49 These ships were mainly powered by engines supplied from the British builders from the Clyde.

Derry and Williams, argued that the changeover in shipbuilding from using wood as the main material to iron was a surprisingly slow endeavour.50 However, J. F. Clarke, argues against this, saying that the USA changeover from wooden to iron shipbuilding continued for longer period than in the UK. “…technology offers ever widening choices it does not inherently require the adoption of new techniques. There is too frequently a general misunderstanding of the time required to transform an invention into an innovation and the even more extended time scale necessary for general adoption of new innovation.”51 Clarke gives the account of H. E. Deadman, who was a naval architect, from 1871, which states the change was rendered harder by the circumstance that those who designed and build vessels were more favourable towards wood as material and were not familiar with the properties of iron, while on the other hand those that did know how to work with iron were not familiar with shipbuilding theory.52 Clarke writes that the shipbuilding industry was characterised as investments goods industry with violent fluctuations.53

Until 1855 the Lloyd’s Register had no rules for iron ships, however iron ships were classified and included in the register before that time. The interest of the society was first directed towards iron in October of 1836, when a report was received from Liverpool, were the local surveyors surveyed a 77-ton ketch named ‘Goliath’ which was meant for steam dredging in the Bay of Tunis and was constructed by Messrs. Fawcett. “After considering the report, the Committee agreed to record the vessel’s particulars in the Register Book, without any classification, and her name is to be found in the Supplement to the 1836 Book with the

47 Eric J. Graham; Clyde Built, Blockade Runners, Cruisers and Armoured Rams of the American Civil War (Birlinn, Edinburgh, 2006) p. 20.
48 Ibid., p. 20.
49 Ibid., p. 20.
51 J. F. Clarke; The Changeover from Wood to Iron Shipbuilding (Octesional Papers in the History of Science and Technology No. 3, Newcastle upon Tyne Polytechnic Faculty of Humanities, Newcastle, 1986) p. 1.
52 The ANNUAL OF ROYAL SCHOOL OF NAVAL ARCHITECTURE 1872 article “From Wood to Iron in Shipbuilding” pp. 13-20 quote on p. 17, Deadman (1843-1925) obit. In Trans. Inst. of Naval Arch. v. LXVII (1925) pp. 363-51 as a Chief Constructor in 1902 was responsible for first class protected cruiser and was later Assistant Director of Naval Construction in charge of destroyers – see Brown, A Century of Naval Construction (1983) from Ibid., p. 1.
53 Ibid., p. 3.
The next year, 1837, saw the first iron steamer to receive class in the Society, this was the 180-ton ‘Sirius’ built by Messrs. Fairburn & Co., at Millwall. This was done under the inspection of the Society’s London Surveyors. The vessel was intended to be registered in the port of Marseilles, and it was intended to serve on the River Rhone. The character of A1 was assigned to that vessel with any term of years, it also did not get the Surveyor’s recommendation of annual survey until that condition was made general at a later date.55 ‘Sirius’ was followed by the ‘Ironside’ a 270-ton vessel constructed in 1838 in Liverpool by Messrs Jackson & Jordan and was ordered by Messrs. Cairns & Co. of that same port. No class was assigned to this vessel and her particulars, date of survey and the usual notation “Built of Iron” were inserted in the Register Book. “From 1838 to 1844, the Committee continued to record iron ships in the Register Book with no other designation than “Built of Iron”, but on the 4th January of the latter year a resolution was passed that “in future, the character A1 will be granted by the Society to vessels of iron, built under the survey of the Society’s Surveyors, and reported to be of good quality and substantial materials and with good workmanship. All such vessels to be surveyed annually.”56 The authors of the Annals of Lloyd’s Register from 1934 argue that the change from wood to iron was a gradual process, however by 1844 the number of iron ships started to increase and that led to great demand for some higher class, which would be based on fixed term of rules to be established, that the Committee had no other choice but to compile and create such rules. “This request was, however, made in vain, and the Iron Rules remained in a vague and indeterminate form until the year of 1854.”57 The Society did not want to impose stringent rules of construction of such vessels in such an early stage, they wanted more lengthened experience at hand before they commit. This opinion was also supported by the shipbuilding community.58 An interest to this is comment done by Robert Napier, which is included in the Appendix C, Paragraph II. During this period of transition, the opportunity for submitting proposed specifications for new iron vessels to the Committee, before building them, was given to the shipbuilders. 1853 saw sudden increase in the iron vessel production, which meant that need for rules became urgent and a special Sub-Committee was appointed to create such rules. “Mr. Martin and Mr. Ritchie, the Society’s Principal Surveyors, visited the most important shipyards of the Kingdom, and the experience gained by the Society’s Surveying Staff was carefully collated.”59 The work on the initial draft of these rules was probably done by a conference of senior surveyors which was held February of 1854 in the city of Glasgow. The place of this meeting was very important, as Glasgow was one of the most important iron shipbuilding port. After small changes done by Liverpool and General Committee those set of proposals, appeared in 1855 as the first “Rules for Iron Ships”.60 Appendix C, Paragraph III would include the remarks which were at the preface of those rules. According to this set of rules ship which were built under survey could be classed from six, nine to twelve years, however they were to be occasionally or annually surveyed and also were to be surveyed in special drydock or on blocks every third year.61 The remarks of Mr. Ritchie, who took part in the creation of those early set of Rules are included in Appendix C, Paragraph IV. After some alterations done in 1857, those set of rules lasted for about a decade, however it could be argued that they did not get universal approval. Difference existed between the main centres of industry, they in turn created strong opposition towards any standardized regulation which did not coincide with the local practice. “Small wonder, therefore, that these years proved a testing time for the Society, during which a rigid adherence to printed rule and regulation, such as obtained with wood ships, would undoubtedly have provoked a crisis had it been applied to the new industry. Happily, however, the General Committee wisely supported their Chairman, Mr. Thomas Chapman, in encouraging development in construction, and in avoiding that rigidity in applying the Rules, that insistence on the latter rather than on the spirit, which would have produced

54 Annals of Lloyd’s Register, Centenary Edition, 1934 (Lloyd’s Register of Shipping, 71 Fenchurch Street; London; 1934) p. 80.
55 Ibid., p. 81.
56 Ibid., p. 81.
57 Ibid., p. 81.
58 Ibid., p. 82.
59 Ibid., p. 83.
60 Ibid., p. 83.
61 Ibid., p. 83.
precisely the opposite result." This shows how the change from wood to iron was such a charged moment in the history of the shipbuilding industry in general and in the history of the Lloyd's Register in particular, as is stated above crisis was barely averted by not strictly following the set of rules to the point. This is certainly true for any other monumental change in any industry. This practice allowed the shipbuilders to submit alternative designs to the Committee to approve. This led to July 1857, when the foundation of the successful operation of admitting vessels for classification which were not built to the exact specification allowed by the Rules set by the Lloyd's Register Committee, but were "equivalent hitherto". Under this important departure from previous practice, it was agreed that ships "built on peculiar principles" should be specially surveyed every two years, and marked "Experimental (B.S.)," denoting that they were of an experimental character and were classed subject to their being surveyed biennially. This ruling was shortly afterwards extended to permit of the "Experimental" notation being deleted upon a satisfactory special survey of the vessel at the end of four years. Following the introduction of the iron ships and the many problems connected with this it was realised that a new discipline of naval architecture to be established. This was shown by the inauguration in 1860 of the Institution of Naval Architects in London. Mr. Ritchie's address in 1863 towards his fellow members in this institution, shows the attitude of Society; the address is presented in Appendix C, Paragraph V.

However, the era of wood as construction material has not passed completely into history yet, as there were still ships build with iron carcasses overlaid with wooden planks on top, those vessels were called "composite ships". Those ships were viewed as an intermediate stage. "It was discovered that the underwater parts of iron ships were subject to fouling, and in many cases vessels were built of "composite" construction, the internal structure of the hull being of iron, and the outside wood planking attached to iron frames." The "Tubal Cain" was an 787-ton vessels which was entered in the 1851 edition with notation "Iron frame, planked" and bear the A1 character with no limit of years, it was also the first composite vessel to appear in the register. However, ships of composite construction were markedly more expensive than those built from wood. The boom of trade with the East Indies and China, via the Cape of Good Hope, sparked an interest in ships capable of traversing this route with great speeds. Those vessels were called "clippers". The earlier tries at building composite vessels were branded as experimental when this type of construction was introduced in the register. "...later Mr. Waymouth was instructed by the Committee to prepare Rules for the construction of Composite Ships, and these were approved and published in 1867. As with wood ships, the period of classification assigned was based upon the nature of materials employed and the character of the fastenings." Those rules were so well written that they were adopted to such an extent that almost every composite ship built after their publishing was built according to their provisions. However, the era of the composite clipper was coming to an end around the 1870, when the Suez Canal was opened for trade. This allowed the iron steamer to become a strong adversary to this type of vessels. Soon after this the clipper design was abandoned in favour of other designs.

In this section we will look at how the shipbuilding industry changed from iron based to steel-based industry and we will look at case study on Barrow-in-Furness. The next change in the shipbuilding industry during the nineteenth century came in the form of a transition from iron to steel as the main material for ship hulls. The first attempts at building steel hulls for ships were made at 1858 and 1859 for building small steamboats using Bessemer mild steel. Not until 1880, however,

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62 Annals of Lloyd’s Register, Centenary Edition, 1934 (Lloyd’s Register of Shipping, 71 Fenchurch Street; London; 1934) p. 84.
63 Ibid., p. 85.
64 Ibid., p. 85.
65 Ibid., p. 81.
66 Ibid., p. 87.
67 Ibid., p. 87.
68 Ibid., p. 88.
69 Ibid., p. 89.
steal began to be used for ocean going steamships.\textsuperscript{70} Clarke and Storr provide this quote: “Variations in the price of steel, the primary raw material, were a special problem. As early as the 1850s Palmers of Jarrow began to produce its steel…”\textsuperscript{71} Pollard and Robertson argued that by the late 1870s steel was implemented in the hulls of almost all ocean-going merchant vessels. By then the shipyards at the river Clyde had completely transferred to steel.\textsuperscript{72}

During the latter 1870, and more precisely in 1877, the wide adoption of mild steel for shipbuilding followed the introduction of Siemens Martin, or Open Hearth, process of manufacture.\textsuperscript{73} “Before that time, however, the Committee were requested on several occasions to approve the construction of ships built of steel. The process of steel manufacture then existing, however, were not sufficiently perfected to produce a material of a uniform and trustworthy character, and, in absence of experience regarding its durability, the Committee decided that it was not in their power to sanction such proposals.”\textsuperscript{74} One of the early proposals was to use puddled steel and to utilise lighter scantlings than those which were required by the Rules for iron vessels. The Committee of the Register gave their expert opinion, however, their received a reply that this product “might be described as tolerably good iron, but with no resemblance to steel,”\textsuperscript{75} After this no departure from the rules was sanctioned by the Committee. During 1866 plans for building a 1,552-ton vessel of Barrow haematite steel in which one third of the sectional area of the material from the iron scantlings was received.\textsuperscript{76} This proposal was again carefully considered, it was also referred to the Liverpool Committee, it was agreed that reduction of 25% should be allowed in regards to the higher tensile strength of the material. However, special care should be taken regarding the steel used and the rivets which were used and the ship be classed as an experimental after its completion.\textsuperscript{77} In Appendix E, Paragraph I a request from the Barrow Haematite Steel Company manager would be provided which would give more information on the experiments which the surveyors of the society carried out, and the resolution which the Committee reached. Following these experiments the first ship to receive a classification under these new set of rules was the 430-ton screw steam ‘Annie’ which was constructed by Messrs Samuelson of Hull, it was built in 1864, a was assigned a class in 1867, with remarks stating “(Steel)” and “Experimental”.\textsuperscript{78} Test carried out at the Bolton-le-Moors and at Whittington, near Sheffield, had overwhelming results, with reports claiming that the quality of the steel did not allowed the Surveyors to recommend any reduction in the scantling from that prescribed for iron of good quality The first attempts at creating steel had resulted in material which was hard, brittle and of untrustworthy character, and if the material succeeded in being suitable for shipbuilding, its price was prohibitive.\textsuperscript{79} In the ten years period, between 1867 and 1877, many changes were introduced, improvements such as the Bessemer process, the Siemens-Martin or Open-Hearth manufacturing process. “The production, at a greatly reduced cost, of a mild and ductile material was thus rendered possible, and its use for the construction of ships and machinery opened a new era in shipbuilding…”\textsuperscript{80}

\textsuperscript{70} J. F. Clarke & F. Storr; \textit{The Introduction of the use of Mild Steel into the Shipbuilding and Marine Engine Industries} (Occasional Papers in the History of Science and Technology No. 1, Newcastle upon Tyne Polytechnic Faculty of Humanities, Newcastle, 1983) p. 1.
\textsuperscript{71} S. Pollard & P. Robertson; \textit{The British Shipbuilding Industry 1870-1914} (1979) p. 29 from J. F. Clarke & F. Storr; \textit{The Introduction of the use of Mild Steel into the Shipbuilding and Marine Engine Industries} (Occasional Papers in the History of Science and Technology No. 1, Newcastle upon Tyne Polytechnic Faculty of Humanities, Newcastle, 1983) p. 1.
\textsuperscript{72} Ibid., p. 1.
\textsuperscript{73} \textit{Annals of Lloyd’s Register, Centenary Edition}, 1934 (Lloyd’s Register of Shipping, 71 Fenchurch Street; London; 1934) p. 135.
\textsuperscript{74} Ibid., p. 135.
\textsuperscript{75} Ibid., p. 135.
\textsuperscript{76} Ibid., p. 135.
\textsuperscript{77} Ibid., pp. 135-136.
\textsuperscript{78} Ibid., p. 136.
\textsuperscript{79} Ibid., p. 137.
During 1885 the Chief Surveyor Martell, received instructions to compile a draft of Rules and Tables of Scantlings for the classification of steel vessels. His first draft was a different system for determining scantlings, it took into account variation of girth in the different sections in the length of a ship, however it ultimately got scrapped in favour of adhering to the midship girth as a factor in the numeral for determining scantlings, due to large number of views and opinions in the technical authorities which were concerned. “The new Rules for Steel Ships were framed on this basis, and were adopted by the Committee in November, 188. In addition to new Tables of Scantlings, they contained the Society’s requirements for the inspection and testing of the steel material to be used, and also a List of the Steel Works recognised by the Committee for its manufacture.”

The transition from iron to steel to a very short period, in a frame of a decade, as the mild steel was used in more than 90% of the merchant vessels built under the Society’s classification. The supervision was very rigid, as additional Surveyors were appointed to carry out steel testing. Also, special Inspectors of Forgings were included in the staff, they held special qualification for inspection of all large forgings and castings. This change was of great benefit to makers and purchasers as previously such inspection was carried out after delivery of the ready forgings in the shipbuilding or engineering yards. As a result of the experience gained from working with the new material the rules were updated throughout the 1890s. In 1895 the Committee adopted Rules for ‘deep framing’, these were girders which had more amount of rigidity to the structure. However, they reduced the capacity of the hold spaces. But this had none of the disadvantages of the previous types of scantling and proved that they had the needed strength and stiffness.

As Anthony J. Arnold argues different types of innovation gave the UK its first place in the global shipbuilding industry during the half a century period from 1870s to the 1920s. “The successful development of marine steam engines in the 1830s and the shift from wood to iron and then steel as the dominant construction material were probably the most fundamental, but later in the century the growth of the Royal Navy promoted numerous changes in ship design and methods of production which had important implications for the way British shipbuilding was organised.” Those organisational changes established some of the coastal and river towns in the Northern part of England and Scotland. Such was the case with Barrow-in-Furness. The discovery of major deposits of the iron type haematite, in this area encouraged many investments. Initially, in the dock and railway transport as links to other major industrial centres of the UK. “As late as 1845, Barrow consisted of only seventeen houses, with a total population of less than seventy, but by 1871 its population had reached 18,584. In the next ten years it grew with “amazing rapidity to 47,259, with nearly 500 acres of docks and wharves and the largest steelworks in the world; it was variously described as the “English Chicago” and the “New Liverpool”. However, the fortunes of this discovery were not everlasting, and in the mid-1870s, the demand on iron and steel markets dropped and those had drastic effect on the railway company, the docks and the shipyard. They had an extensive capacity which in good times was never used to the full extent, and during a crisis period this capacity was seen as a drawback. “The ambitious plans for the development of Barrow began to founder, and the small group of backers, particularly the Duke of Devonshire, were faced with a crisis.” One of the solutions for the shipyard was to seek a suitable buyer, and such a buyer was found in the face of Vickers from Sheffield. As was said above the local iron ore gave the basis of the industry in the region and more specific in area of Barrow. As Arnold writes this region had long history with ore smelting and mining since the thirteenth century. The deposits at the Park Vale area contained more than eight million tons of the best quality

80 Annals of Lloyd’s Register, Centenary Edition, 1934 (Lloyd’s Register of Shipping, 71 Fenchurch Street; London; 1934) p. 137.
81 Ibid., pp. 139-140.
82 Ibid., p. 139.
83 Ibid., p. 140.
85 Ibid., p. 62.
86 Ibid., p. 63.

haematite ore and were described by H. W. Schneider as “fabulously rich” in 1851 when he found it. Problems with Piel in the 1850s encouraged the railway company to look instead to Barrow as its port, and eight deep-water jetties were quickly installed to increase the number of ships that could enter to move the local minerals; 445,000 tons were shipped out in 1856, three times the amount transported in 1849.

As Anthony Burton argues the notion that once the steam power was discovered the age of sail power ended abruptly is just awry. “If the Queen Mary is the most famous steamer to be built on the Clyde, then the Cutty Sark must be the most famous sailing ship. She was built at the Scott and Linton yard at Dumbarton in 1869. She continued to trade under sail right through to 1922, within a decade of work starting on the Queen Mary.” This is showing how sometimes the history could be simplified; however, this leads to many problems, the history does not know strict periodisation. Like it is stated above the discovery of steam did not in fact stop all usage of sailing ship, the process continued parallel, steam ships were built and developed while sailing ships continued to be utilised on the waterways for trading and passenger transportation. Even though, again, steam was discovered, sailing ships continued to be built alongside the new models with the new propulsion, this was sometime due to the fact that some shipyards were unable to make a transition to building steam ships or the shipyard owners were more focused on building sailing ships, there are many factors that factor in these transitions. The engineers began the steam engine development in mid eighteenth century, by the early nineteenth century they have achieved a growth in the stationery steam engines usage in the industry. This development was rather steady than spectacular, argued Derry and Williams. However, this was also accompanied by the first successful attempts at using steam engines for transport. Mankind’s first great step in the conquest of distance since the development of sail required a new-prime mover that would be self-contained, reliable, and powerful — in a word, the steam-engine. From this we come to our main interest in this section, the application of steam power to the ship.

The only viable transport, which was big enough to take the weight and the size of the first steam engines was the maritime one. However, even the application of the steam power to ships had some problems which made the designer think fast and hard, in order to overcome them. In stationary engines used for pumping and similar applications the disadvantages of a great size, weight and heavy fuel consumption were more than counterbalanced by ease and cheapness of construction, erection and maintenance. In ships, however, the disadvantages were far more serious. To transport enormous deadweight of machinery and fuel was clearly uneconomic. Furthermore, there where further technical issues, such as keeping a proper distribution of weight, in order for the vessel to stay afloat and not sink like a stone. The low centre of gravity for ships is essential, as not to allow them to capsize and maintain stability at sea: “…the massive beam of early steam-engines was placed high up, so a modification of design was required that placed the beam lower.” The problem of fuel seemed as secondary consideration, as long as steamships kept to the rivers, lakes, canals or coastal waters where refuelling stations were close at hand and the needs for frequent refuelling could be satisfied, Derry and Williams argue.

Pollard and Robertson look at the pattern of output of steamships in the United Kingdom, by July 1914 they argue that 42% of the tonnage allocated to steamships globally was on the register books of the United Kingdom, if the colonies and dominions were included in the equation the number rose to 45%

88 Ibid., p. 65.
91 Ibid., pp. 326-327.
92 Ibid., p. 327.
93 Ibid., p. 327.
total. Those ships carried 71% of the total maritime trade of the British Empire, internally or internationally, but also 30% of the foreign trade outside the Empire zone of influence.  

A. C. Hardy in his short description of the history of the steam engine in maritime use, remarks that the first steam engines were purely regarded as auxiliaries to wind power. This was further supported by the fact, according to him, that the early propellers were design to be lowered into the water when the steam engine was engaged. The author argued that one of the reasons for this was the vast wastefulness of coal of the first engine, and that ships were not able to carry a sufficient supply of coal for long voyages. “In 1843, “the great engineer Brunel proved by the Great Britain that the day of the wooden ship had passed; and the next ten years were marked by the substitution of iron for wood in shipbuilding.” However, Hardy writes that the first to design and build a steam ship in the UK was William Symington, he constructed his ship in the river Carron. By the mid-1850 the paddle wheel, initially utilised to propel the ships, gave way to the screw propeller, which gave more efficiency and speed to the vessels. By the decade from 1875 to 1885 the twin screw was introduced. “Amongst improvements in steam generators may be mentioned in the introduction of forced draught, whilst in naval and technical circles the “Battle of the Boilers” raged round about the year 1895 and was waged furiously between partisans and opponents of the water-tube boiler – a battle which is carried on almost to this day [1931] over the question of fitting water-tube boilers in merchant ships, although increasing attention is being given to the potentialities of the latter.” The zenith of the coal-fire, Scotch boilers and triple and quadruple expansion reciprocating steam-driven engines was reached by the closing of the nineteenth century in numbers. “From that time onwards there were three big disturbing barriers in the path of their progress – the turbine, the internal combustion engine, and the utilisation of oil as fuel.” As the coal was the main product of the United Kingdom and was the principle fuel for its merchant and naval fleets, there were no real question to replace it with any other fuel which had to be imported, unless it was of superlative merit, as Hardy puts it.

The Lloyd’s Register first set of Rules which were concerned with the size of shafting were published in 1888, the same years as the Rules for steel ships. However, they received amends in 1900 after recommendations of a special sub-committee which considered the subject of accidents to shafts of steamers, especially during Atlantic passages in ballast.

The introduction of the steam engine for warships meant greater speed than was possible before, while for the merchant vessels the aim was to be more economic in their operation. “Within relatively few years, iron and later steel had begun to supersede wood in ship construction and because these new materials had greater density than water, watertight bulkheads had to be provided to ensure some degree of buoyancy in the event of damage below the waterline. Not unnaturally, the degree of watertight subdivisions was very much greater in warships, which had numerous fully watertight compartments, than in their commercial counterparts which were limited to provision of collision bulkheads.” From these developments it followed that any conversion from merchant ship to warship would produce a very slow vessel and it also would be lacking the necessary safety that a war vessel might need, even if it might be possible to mount adequate guns necessary for modern warfare on merchant hull. Furthermore, the size of the merchant vessel

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95 A. C. Hardy; Oil Ships and Sea Transport, A story of oil in relation to its effect on sea transportation (George Routledge and Sons, Ltd., London, 1931) p. 9.
96 Ibid., p. 9.
97 Ibid., p. 10.
98 Ibid., p. 11.
99 Ibid., pp. 11-12.
100 Ibid., p. 12.
101 Ibid., p. 13.
103 (ed.) Richard Osborne; Conversion for War (World, Ship Society, Monograph no. 6, Kendal) p. 4.
is almost always bigger than the warship due to cargo requirements and this would present much bigger target profile for the enemy, argues Richard Osborne. “Despite these shortcomings, all navies have been prepared to use merchant vessels as naval auxiliaries in time of war to make up for their shortages or lack of purpose-built warships.”¹⁰⁴ The auxiliary cruisers were the most employed merchant conversions, these types of vessels were employed in the protection of trade routes. The liners “Massilia”, “Rosetta” and “Lusitania” were employed to serve as armed merchant cruisers during 1885, when there were tensions with the Russian Empire, which might have led to war. The USA, employed the same tactic and armed numerous merchant ships and put them on patrol duties in 1898 during the Spanish-American conflict.¹⁰⁵

After the 1850s all governments started to set up a reserve of steam vessels which could be turned in armed merchant cruisers, if the need for that ever arose by subsidising in one form or another.¹⁰⁶ “The British method was by lucrative mail contracts, subsidised loans for building specific ships; foreign means were outright payments, or even state owned lines.”¹⁰⁷ So for the period starting 1870 to the outbreak of the Second World War, in 1939, the UK had enough vessels available to be converted to armed merchant cruisers if the need came. Those ships were stiffened further so they would be able to take the necessary armaments. “In the main they comprised the intermediate liner type of around 15,000 tons, mainly steam and oil fired, and self-sufficient in water taking into account the reduced complement as an AMC.”¹⁰⁸

All these changes happening in the industry during the nineteenth century forced the shipbuilders to re-organise their business and yards, which in turn lead to re-organisation of the whole industrial complex of the United Kingdom. The iron and steam developments pushed the yard owners to employ more diverse capital and labour inputs, in the words of Sidney Pollard and Paul Robertson. “The new vessels could not be built without equipment for moving and shaping huge metal components, and the talents of a wide range of skilled craftsmen were essential.”¹⁰⁹ The relation between shipyard suppliers and customers and shipbuilders were changed by the complexity and size of new vessels coming out of the slips.¹¹⁰ “Iron and steel shipbuilding played an important role in late nineteenth and early twentieth-century British economic development. The value of new merchant vessels accounted for approximately 1.25 per cent of Britain’s gross domestic product at the turn of the century, and the industry employed about 2 per cent of the industrial labour force. Between 1890 and 1914 the rate of growth of shipbuilding output exceeded that of the economy as whole…”¹¹¹ Lorenz, argues that the shipbuilding in those decades preceding the outbreak of the Great War in 1914, was one of those few British industries, which held an undisputed global supremacy.

The British position of domination in the global shipbuilding, during the last decade of the nineteenth century and the first decade of the twentieth century, is explained by most researchers with the fact that British shipyards enjoyed an advantage from the greater size of the their ship market, which in turn allowed for more inter-yard specialisation writes to Edward Lorenz, who sites Pollard, 1957; Pollard and Robertson 1979; ch. 2; Parkinson 1960: 150-2.¹¹² However, Lorenz argues differently, he similarly rests his explanation on the key role of market conditions, he claims that the United Kingdom was only able to realise the benefit of its advantageous economic position through the creation of a set of labour-market and enterprise

¹⁰⁴ (ed.) Richard Osborne; Conversion for War (World, Ship Society, Monograph no. 6, Kendal) p. 4.
¹⁰⁵ Ibid., p. 4.
¹⁰⁶ Ibid., p. 8.
¹⁰⁷ Ibid., p. 8.
¹⁰⁸ Ibid., p. 8.
¹¹⁰ Ibid., p. 88.
¹¹² Ibid., p. 24.
institutions.\textsuperscript{113} “These institutional arrangements, which I call the craft system, secured British producers adequate supplies of skilled shipyard labour with sufficient expertise to co-ordinate the work process independently of managerial supervision.”\textsuperscript{114} Edward Lorenz writes that the UK’s output was accounting for around 60 per cent of global vessels output and was controlling around 80 per cent of the global export business as late as one year before the war in 1913.\textsuperscript{115}

As is pointed out later in this work, Hugh Murphy argues that the British shipbuilding was “atomistic in structure” when we speak about the merchant shipbuilding programs up to 1914. However, after the Naval Defence Act, which was passed through parliament in 1889, some concentration and vertical integration was observed. The Act allowed privately owned shipbuilding enterprises to group together and enter the market which previously was reserved for the Naval Dockyards, although some exceptions existed. Those were predominantly mixed naval and merchant shipbuilders. “The passage of this act served as the impetus for an enormous expansion of the private armament industry, and hence raised the question of need for an assured market for its products.”\textsuperscript{116}

\textbf{PART II}

\textit{XX\textsuperscript{th} century; The Great War; The Interwar Years; The Second World; The Rise of the Container Vessel Concept}

The twentieth century could be argued was the beginning of the end for the British shipbuilding industry as dominant factor in the UK. The century saw the industry reach its peak on the heels of the nineteenth century technological and science advancement and in the years leading to Great War. However, those early decades saw the rise of a strong international competition mainly from Germany and USA, which was not that easy to defeat. Then during the first interwar decade the shipbuilding showed the first contracting signs, which became full blown industry decline in the 1930s. Those signs in the 1920s were not properly recognise for what they were and counter measures were not put forward, so when the next decade came and the decline hit the industry was unprepared. The 1940s, which saw the six-year period of the Second World War saw the shipbuilding industry pick-up the pace again due to war demands, however from then on, the decline of the industry could not have been avoided. The 1950s and 60s were relative stable, however the end came with 1970s and finally late 1980s saw the last shipbuilding companies fold. In the 1990s the industry was a shadow of its former self, with yards been left empty and as silent monuments to the past glory in many places of the UK, notable Glasgow, Sunderland and Newcastle. In this section we will look in depth how this came about and also how this was reflected in the Lloyd’s Register of Shipping database. We will also look at some other shipbuilding databases that began to be created in the second half of the century, like the BSD (the British Shipbuilding Database) which was started in the 1970s.

Another good source of information on the shipbuilding industry are the Lloyd’s Register Annual Reports. From these reports we can gleam what was the tonnage produced for any given year for which those records were published, it can show us the rise and fall of the shipbuilding output for certain periods and it can also give us more information on the shipbuilding industry development throughout the years. However, during the Great War, the Lloyd’s Register did not produce any Annual Reports for the year 1916-1917 and 1917-1918, only resuming for the year 1918-1919. Although, they give an account what occurred during the war years in their report for the 1918-1919, which marked the end of the conflict on the Western Front. During this decade the Lloyd’s Register of Shipping was officially recognised by the French and Russian Governments. In April 1907, a new French Shipping Law was passed, the law came in operation in March

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\item Ibid., p. 24.
\item Ibid., p. 1.
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of 1909 and allowed “… all vessels which hold the highest classification of the Bureau Veritas or of Lloyd’s Register will be accepted without further survey as eligible to be granted the requisite “permis de navigation” as regards structure and condition of hull and machinery and equipment of anchors and cables.” 117 If the vessels sailing under the French flag they were exempted for some frequent and other surveys which required the ship to be put in dry dock for a time. “The Societies above named are, moreover, empowered to assign and certify the Freeboards which will now be compulsory in the case of French vessels. It is needless to say that the granting to Lloyd’s Register by the French Government of these privileges is a matter of much gratification to the Committee, in view of the number of French vessels which hold the Society’s classification and also of the further evidence which it affords of the international recognition enjoyed by Lloyd’s Register.” 118 Around this time the Russian Government started to officially accept the surveys that were carried out by surveyors employed by the Lloyd’s Register of Shipping. This is in connection with “…the conditions prescribed by the Board of Trade under the British Merchant Shipping Act (1906), as regards the granting of passenger certificates to Russian vessels trading to or from ports in the United Kingdom.” 119

During the first decade, the need to revise the rules for construction of vessels made out of steel was evident in the board of surveyors of Lloyd’s Register of Shipping. This work was done in the span of several month during 1908. “The old Rules, originally adopted many years ago, had been kept up to date by means of amendments and additions made by the Committee from time to time, and proved sufficiently adaptable to be applied as a standard of strength to the various new designs produced by naval architects to meet the requirements of modern oversea trade.” 120 Due to the rapid progression of technology for the merchant navy, the old set of rules was beginning to become obsolete, and a revision was deemed to be a good decision which would allow to reflect better the changing ways of construction. “The Committee believe… the work has been successfully accomplished and that the revised Rules… have already been accorded a very favourable reception, will be found to meet the Shipowners’ demands for vessels of great cargo capacity, economical both as regards weight and cost, while still maintaining the high standard of efficiency…” 121

For the year, that ended in 30th June 1913, the Annual Report of Lloyd’s Register recorded 10,466 merchant vessels which were over 22½ million tons gross, they also held classes in the register. The committee also assigned classes to 651 new vessels which amounted to 1,664,657 tons. “…which total is the highest for one year ever recorded in the history of the Society.” 122 Of these 593 were steam engine vessels and further 58 were sailing ships. “Of the total, 1,010,876 tons, or about 60½ per cent., were built for the United Kingdom, and 653,791 tons, or about 39½ per cent., for the British Colonies and Foreign Countries.” 123 In the next year, which also ended 30th of June, 10,621 merchant vessels were registered which had a total of 24 million gross tons, even more than the previous year, where it was stated that the tonnage was more than all the tonnage recorded in the previous years. 124 During this period 713 new vessels were assigned class in the Register, they totalled to 2,020,185 tons. Of them 664 were steam engine vessels and 49 were sail powered. Of them 60 per cent were built for the UK and the other 40 per cent for the colonies and foreign states. 125 From these statements it follows that the shipbuilding industry was booming just before
the outbreak of the war in Europe during 1914, furthermore this trend continued during the wartime years as it is stated in the Annual Reports for the period 1914-1919. In 1913, sixty per cent in total of the world market belonged to the United Kingdom shipbuilding companies and shipyards. This statement is also supported by Edward H. Lorenz. However, around this period the steel industry which was one of the main United Kingdom's industry and the main industry which supported the shipbuilding began to lose ground to the German and the United States competitors. "Allen… has presented figures showing that total-factor productivity was lower in British steel before World War I, and Elbaum… has argued that with suitable organizational and technological restructuring the industry could have done better." However, other industries in England, like the cotton and shipbuilding stayed well out of reach for outside competition in the years leading to 1914. Around the start of the century the question of what would be the fuel of future became very acute, the two contenders were the coal and the oil. The coal was already in widespread use in the British merchant fleet, due to the UK’s massive coal supplies mainly in Northern England. However, the oil was easier to work with and was recently recognised as a source for fuel products. As A. C. Hardy argues, Britain was a nation of carriers. "We, in these little islands, do not entirely appreciate, therefore, how much transport and in particular sea transport, is bound up with our national well-being. We do not often think, in fact, that – a little less than the Scandinavians we are a nation of carriers… We have been forced into this position gradually and to some extent against our will by the gradual change over of the World Power Source from coal to oil." He further argues that not the discovery of coal, but the realisation that its commercial adaptation in the steam engine helped to launch Great Britain to a leading global position. In 1931, Hardy wrote, that coal could never be replaced and any who claimed otherwise was very bold man. However, this was proven wrong in the next decades. He also wrote that; in his opinion the more likelihood was that coal could reappear again distilled into oil. The author argued, that world passed trough several changes in its maritime history, the first, according to him being, the change from sea navigation to ocean navigation, which was the discovery of the North and South America, which influenced changes in the ships design and construction methods. Several centuries later the development of the clipper type further imposed changes on the design of maritime vessels. Along with these developments during the eighteenth and nineteenth centuries the development of the steam engine replaced the need for sails and made the sea transport faster, easier and safer. This development further led to search for stronger materials for use in ship construction and after many years of bitter conflict the wood was first replaced by iron and then shortly after with steel. "Of recent years comparatively, on the marine engineering side has come the steam turbine, and finally the internal combustion engine, and with it the age of through which we are passing at present, which is the change-over period in the source of prime mover energy from coal to oil." He writes that real reason for adopting oil as the principle fuel came from the fact that oil was with its ease of handling and its cleaner conditions of use and "…not a little with its value as a steam raising medium." The Russian Empire was the first to realise the benefits of the diesel engine for marine usage, when it became viable commercially, as it had in its borders the massive Caspian Sea oilfield. The Russian scrapped still usable steam reciprocating machinery and cylindrical boilers in order to replace them with internal combustion engines within existing vessels in its fleets.

129 A. C. Hardy; Oil Ships and Sea Transport, A story of oil in relation to its effect on sea transportation (George Routledge and Sons, Ltd., London, 1931) p. 4.
130 Ibid., p. 8.
131 Ibid., p. 13.
132 Ibid., pp. 13-14.
Hugh Murphy describes this period, prior to 1914, of British merchant shipbuilding as “atomistic in structure” and the industry was mainly geared towards “bespoke products to order.” He also, writes that Britain possessed 540 building berths, much more than Germany’s 140, UK further had 185 building berths with more than 700 feet length with respect to Germany’s 11. “In 1913, British shipyards produced nearly two million grt of merchant shipping, more than the output of all other nations combined, and four times the output of its nearest rival, Germany.” An interesting fact, to note, since 1902, UK has produced all the main engine for naval vessels, and sixty percent of all the Admiralty orders were provided by privately owned shipyards. “Naval demand and the deteriorating world strategic situation had also led increased export orders for warships, with British shipbuilders accounting for four-fifths of all foreign warship orders.” By 1914, along with those naval warship orders, the British Empire had in its disposal a merchant navy which comprised 45% of the global tonnage and Germany its closest rival only 11%. “Almost ninetenths of its tonnage was engaged in overseas trade, of which sixty percent was involved in tramping.” Certainly all these numbers were impressive and they were what allowed Britain to gain and retain its dominance in the global shipping scenery.

It is stated in the Annual Report for the year of 1914-15, that the “…Committee is pleased to record that, despite the losses incurred by the mercantile marine through the war, the tonnage of vessels which were classed in Lloyd’s Register Book at the close of the year ended 30th June, 1915, was 300,000 tons in excess of the tonnage classed at the corresponding date in 1914.” The Committee of the Society states that the merchant shipbuilding has slowed down due to the war demands, the construction of vessels have been delayed or in some cases stopped altogether. In their view this was not only the cases in the UK but in all countries which were actively involved in the war. “The dislocation of shipbuilding in those countries has naturally given an impetus to the industry elsewhere. Thus we find greatly increased activity in shipbuilding the United States of America, in Japan, in the Scandinavian countries and Holland.” However, they note that the most increase in shipbuilding is observed in the USA, where for the year of 1914-1915 the tonnage under construction is the biggest on record for that country. From this statement, Lloyd’s concludes that the actual volume of tonnage which was existing in the world was not much different from that which existed 12 months ago, but its distribution was drastically different amongst the several shipbuilding countries.

The outbreak of hostilities in 1914, which marked the beginning of the Great War, saw the major naval powers employ a high number of merchant auxiliaries to supplement their navies. The UK employed mid-sized liners to anti-raider duties and distant blockades, they were of course armed with suitable naval guns to allow them to carry out these tasks. Furthermore, small sailing vessels and cargo ships were used as submarine decoys. “Some cross-channel ferries were converted to seaplane carriers while a host of trawlers and drifters was employed in a variety of patrol duties and other duties.” Other ships were used as depot or base ships and repair facilities.

The next Annual Report of 1915-1916 sees Lloyd’s Register of Shipping make this statement: “The disappearance from the high seas of the merchant fleets of Germany and Austro-Hungary, and the
continued losses of allied and neutral shipping, combined with the enormous demands which the war has made upon the available tonnage, produced a shortage which has stimulated the building of ships in every country free to engage in ship construction.\footnote{P.P. 2486. qa (3) Lloyd’s Register of British and Foreign Shipping Annual Report, 1915-1916 (71, Fenchurch Street, London, E.C., 1916) p. 3.} An observation is made that the United Kingdom shipbuilding industry is still restricted due to the navy requirements for shipbuilding and new vessels for the sea war. The output was still far below the normal in peace time, despite the fact that a considerable progress has been made in rate of progress for the construction time.\footnote{Ibid., p. 3.} The United States has established new plants and enlarged existing plants to cope with demand of tonnage that occurred in this period.

Wartime is always bringing changes to the established order of things and this was no different in the period of the First World War (1914-1918). During the war over 13 million of gross merchant tonnage was lost at sea on the shipping lanes due to enemy action, however by 1919, after the four years marked by huge losses at sea, the tonnage that existed was 1.8 million more than in year 1914. “In 1921 Greece was the only country, apart from Germany, to show reduction in tonnage as compared with the pre-war years, and in the ten years 1914-24 the merchant fleets of the world increased by 35.5 per cent.”\footnote{Leslie Jones; Shipbuilding in Britain, Mainly between the World Wars (University of Wales Press, Cardiff, 1957) pp. 27-28.} However, we will elaborate more on this in the next section which deals with the interwar period.

Hugh Murphy argues that the British shipbuilding industry fell under state control after 1916 when the Great War was raging at its peak. “…British shipbuilding industry did not exist in a vacuum, the industry has to be seen in context, especially regarding the potential decisive German U-boat threat.”\footnote{Hugh Murphy; The British Shipbuilding Industry during the Great War: A Contextual Overview Incorporating Standardization and the National Shipyards, 1916-1920 (International Journal of Maritime History, Vol. XXIV No.2; Marquis, December 2012) p. 21.} He further claims that only at the end of 1916, the government of Britain ‘belatedly’ started a program of ship standardisation and creating of National Shipyards program. “This initiative, however, has to be set against a previous lack of standardization and the high attrition rate, particularly after the resumption in February 1917 of unrestricted submarine warfare against Britain, allied and neutral merchant tonnage.”\footnote{Ibid., p. 21.}

In the War Cabinet’s Report for 1917 it is stated that during 1916 the Naval Service has been undergoing continual expansion in order to enable the service to meet any demand made on it “…not only in the seas surrounding these islands, but in the Mediterranean, the Persian Gulf, the Red Sea, the Arctic Ocean, the Pacific, and the Atlantic, where it has co-operated with the Naval forces of the Allies.”\footnote{The War Cabinet, Report for the Year 1917; (Published by His Majesty’s Stationery Office, London, 1918) p. 37.} This means that the Navy pressured the shipbuilders and the shipyards even more with increasing orders and demand for warships, while the enemy actions at sea pressed these same shipyards and shipbuilders to keep up the merchant navy going by building replacements for the lost ships at sea and enacting repairs on damaged ones.

A Ministry of Shipping was formed during December of 1916, it formed a committee to advise on shipbuilding acceleration and standard ship construction programme. There was a hope that a large amount of fuel-efficient cargo steamers could be produced to counter the losses of vessels from the German navy’s submarine campaign. “This new Shipbuilding Advisory Committee (SAC) of January 1917 rendered obsolete the Advisory Committee of Shipping Experts attached to the Admiralty Transport Department since February 1915.”\footnote{Hugh Murphy; The British Shipbuilding Industry during the Great War: A Contextual Overview Incorporating Standardization and the National Shipyards, 1916-1920 (International Journal of Maritime History, Vol. XXIV No.2; Marquis, December 2012) p. 39.}

In the Annual Report for the year 1918-1919 the Society writes that since the outbreak of hostilities in 1914, the work done by the Register has been severely curtailed and the publication of Annual Reports was stopped altogether. This refers to the fact that there is not annual report for the year of 1916-1917 and 1917-1918. The resuming of the publication occurred only in 1919. In this report the Society includes a
report of the last five-year period. The following taken from the report is a pointed statement to what the Society thought of the United Kingdom’s merchant navy in the wartime years: “No apology is needed for entering at some length into the matter, as the vital importance of merchant shipping which has always been recognised by those engaged in overseas trade, has now been brought home to every member of the community. It is safe to say that if our wonderful mercantile marine with its splendid officers and crew had failed us in our time of trial, as the enemy hoped and expected they would, neither our invincible Navy nor our heroic Army could have saved the Empire from a humiliating and disastrous defeat. The nation does not even yet, realize how much it owes to the enterprise and courage of the able men who built up, sometimes under much difficulty, the magnificent fleets of mercantile ships which were destined to play so important and distinguished a part in the war.”

The Appendix, outlines the special tasks that were connected with war, which the Lloyd’s Register undertook, as taken from their Annual Report of 1918-19. In a section called “War Emergency Measures” the Annual Report states the Society’s Technical Committee at Emergency Meetings in connection with critical necessity for merchant tonnage output, reviewed many proposals that suggested economising time, labour and material. “On their recommendation the General Committee in December, 1917, decided as a war emergency measure to allow a reduction in the length of chain cables supplied to vessels, although the size of cable was still adhered to.” There were other measures also taken such as: to sanction for the duration of the conflict to dispense with kedge anchors, hand pumps, Downton pumps. In view of scarcity of timber to not include fitting of wood sparring in the vessels holds and also wood ceiling on tank tops.

At the end of the war many of the auxiliary merchant ships used in the navies of the world were rapidly refitted to serve in their previous role as cargo vessels and many of them were quickly return to ply the trading routes.

For the first year after the war’s end at the Armistice signing in 11th November 1918, the society of the Lloyd’s Register of Shipping writes in their Annual Report that: “The operations of Lloyd’s Register of Shipping during the twelve months ended in 30th June, 1920, the first complete years since the cessation of War, have been of a very wide and far reaching description.” Although the society acknowledges that the problems of the shipping and shipbuilding industry have been largely unresolved by that point, they, in any case, state that the conditions for recuperation of the losses incurred during the years of warfare on the shipping are promising for all maritime nations of the world. Lloyd’s Register’s efforts in their view is shown by the unprecedentedly large tonnage of new ships that had been classed according to the Register’s standards in that period. “During the twelve months ended 30th June, 1920, Lloyd’s Register has classed over 4,250,000 tons of shipping (following on a total of 3,800,000 tons classed in the previous twelve months); moreover, there was at the end of June last 4,930,340 tons of merchant shipping being constructed under the survey of the Society’s Surveyors with a view to classification.”

The Annual Report for the year 1919-20 states the majority of the new tonnage being constructed has been for the USA, Japan and the UK. Other countries in which they recognise heightened shipbuilding activity under the Society’s supervision are Holland, Canada, Italy (including the Trieste district), Sweden, Spain and Denmark. All of which were Entente countries or neutral states. Furthermore, around this time a mass conversion of
vessels to burn oil fuels instead of burning coal for propulsion began. This was a process which acted as a limiting factor for new tonnage output.\textsuperscript{159}

Leslie Jones writes that new ship demand is depending on shipping space demands in relation to the supply of transport capacity.\textsuperscript{160} The ambitions of the allies (except UK) and Germany were developed into tonnage with government aid funding and the merchant navies grew in accelerated pace during the first decade of the interwar period. However, despite this as Antony Burton argues, the factors for the decline were there but the world shipbuilding industry did not realise it, until it was too late. The peak was reached in 1931 with over 70 million gross tonnage. “The depression halted and reversed the process of expansion, and in four years world tonnage declined by 5 million gross tons to 64.9 million.”\textsuperscript{161}

In the immediate post-war period, 1918-1919, the United Kingdom was ready to take once again the place it had before the outbreak of the Great War, as the world’s greatest shipbuilding nation and to begin building vessels for the most renowned merchant navy once more. “If anything, the position seemed stronger then than it had ever been.”\textsuperscript{162} This statement is supported by the Great War reality, which demand an increased ship production to make up for the losses incurred during combat, this meant that after the war ended and the peace settled in, the shipyards had more capacity for shipbuilding than they had before 1914. Antony Burton writes this: “The demands of war had seen an increase in capacity of some forty per cent and order books were overflowing as the shipping lines rushed to replace the losses of the war years.”\textsuperscript{163}

Even the workers, who had received wage raises during the four years of combat, felt good about the future prospects for the industry in which they worked, this was also owed to the fact that the steady rising of the wages continued in the period right after the war. However, Burton argues, that there were some minor indications that the situation was not as good as it should have been. By the year 1920, the total percentage of the British shipbuilding had drastically declined to just over forty percent, a twenty percent decline from the numbers of 1913, on the eve of the First World War. However, Antony Burton argues, that the world markets were never considered as vital to the British shipbuilding industry, “…as long as the red ensign ruled the world, they had nothing to fear.”\textsuperscript{164} The believe at that point in time was that the trade would continue to grow, same as the maritime fleet and prosperity. However, all those assumptions started shaking when the sluggish trade increase on world scale became apparent, only 8 per cent for the whole period, according Burton. The freight rates collapsed because there were too many merchant ships plying the seas in chase of too few cargoes. “Suddenly, it seemed, the demand for new ships had disappeared.”\textsuperscript{165} In 1920, all the optimist figures that were making such good reading few months back suddenly became the opposite. “Looking… at John Brown’s, as good an example as any, 1920s represents the peak with 9,297 men on their books. In 1921 the workforce had been cut to 6,322 and pay to £3 13s. 6d. Next year was worse with manpower almost halved to 3,653 and pay had changed to £2 14s.”\textsuperscript{166} These circumstances endured throughout the 1920s, only to completely crash in 1932. Brown was left with only 422 staff at this point, which mean he was basically left on the level of little more than a maintenance basis. This was a time called the ‘Great Depression’ on the banks of the river Clyde.\textsuperscript{167}

The merchant shipping, however, was not the only problematic area of shipbuilding, the Royal Navy was also inactive through this decade. “This was the time of peace – the ‘War to end all Wars’ was over and there seemed to be no need to plan for the next.”\textsuperscript{168}

\textsuperscript{160} Leslie Jones; Shipbuilding in Britain, Mainly between the World Wars (University of Wales Press, Cardiff, 1957) p. 27.
\textsuperscript{161} Ibid., p. 28.
\textsuperscript{162} Antony Burton; The Rise and Fall of British Shipbuilding (Constable, London, 1994) p. 182.
\textsuperscript{163} Ibid., p. 182.
\textsuperscript{164} Ibid., p. 182.
\textsuperscript{165} Ibid., p. 183.
\textsuperscript{166} Ibid., p. 183.
\textsuperscript{167} Ibid., p. 183.
\textsuperscript{168} Ibid., p. 183.
80% of the global trade, was represented by the sea-going shipping and Jones writes that a rough estimate of the demand for shipping space afforded after the year 1913, by the index of the quantum of world trade compiled by the League of Nations. Taking 1913 as the base year, the League calculated that world trade was 2.3 per cent. less in volume in 1924 than in 1913. The Chamber of Shipping estimated that the volume of trade was 15.6 per cent. less in 1923, and even in 1926 appreciably below the pre-war level.

Todd, also argues that the interwar years, were, as he calls them “dismal” for the British shipbuilding industrial sector. “…the fluctuating fortunes of the 1920s being replaced by grave collapse in demand in the early 1930s.” The combination of the naval rearmament that began in the mid 1930 and the slow trade revival, in his view, “restored some sense of viability” to that sector. Todd, argues that these years can be split into two periods, decade of laissez-faire from 1921 to 1930 and the planned rationalisation from 1931 to 1939. “The former reflects the actions of firms acting alone in response to shrinking markets and heightened international competition, whereas the latter reflects the firms operating in concert to remove surplus capacity.” Todd further argues that there were geographical outcomes of those two rationalisation phases.

As Robert W. Morrell writes during the first decades of the twentieth century there was an ”Amazing Growth of the Petroleum Industry”, by this statement he meant the enormous consumption of petroleum products for different purposes from lighting and lubrication to fuel engines of vehicle, aircraft, ships plus to provide power for industrial sites. These facts have made the transportation of petroleum products very important aspect of the global economy, as Morrell puts it: “… not only of the marine and petroleum industries, but of world commerce and industrial development.” He provides figures from the Lloyd’s Register of Shipping to support his thesis, those numbers show that twentieth percent of the total world tonnage is consisting of oil tankers. By 1931 the tanker tonnage reached a high point and yearly accounts show steady increase of these tonnage numbers. “The production of oil wells in the United States is about two and a half million barrels per day. About one-fifth of this amount is exported from or imported to the United States. The bulk of these exports and imports, as well as a vast movement of domestic oils, both crude and refined products, is handed rapidly, efficiently and safely by tank ships. The use of petroleum products is constantly increasing, the exports of gasoline from the United States showing a particularly marked advance.”

In the international arena, despite political tensions with the newly formed USSR, the integrity of the Lloyd’s Register, as Nigel Watson argues, led to the Leningrad State Shipbuilding Trust to extend an invitation to the Society to survey a range of ships, passenger vessels, tankers, timber carriers and reefers, which were constructed at the time in shipyards at Leningrad and in two other ports NikolaiEii and Mariupol located in Ukraine. For three years, since 1926 to 1929, a team of seven surveyors worked there under J. S. Helyer.

169 Leslie Jones; Shipbuilding in Britain, Mainly between the World Wars (University of Wales Press, Cardiff, 1957) p. 29.
170 Chamber of Shipping of the United Kingdom, Annual Report, 1925-26, p. 45. from Ibid., p. 29.
172 Ibid., p. 117.
173 Ibid., p. 117.
174 Ibid., p. 117.
175 Robert W. Morrell; Oil Tankers (Simmons-Boardman Publishing Company, New York, 1931) p. VII.
176 Ibid., p. VII.
177 Ibid., p. VII.
178 Ibid., p. VII.
179 Nigel Watson; Lloyd’s Register, 250 years of service (Lloyd’s Register; 71 Fenchurch Street, London, 2010) p. 46.
Writing in the 1930’s edition of their Annual Report, the Lloyd’s Register of Shipping states that there are three facts in the development of the International Shipping that were standing out for the society. The first being the large volume of tonnage being built to the society’s standards, the second was that a large part of that tonnage was intended for a transportation of oil in tanks and other such commodities and finally there was a steady increase in demand for internal combustion engines for ship propulsion, which was especially evident for the new tankers.180 “…the increase is largely due to vessels intended for carrying oil. This type of vessels represents 20 per cent. of the tonnage classed, and 55 per cent. of the tonnage for which plans have been passed.”181

The Annual Report gives us a figure of new vessels classed by the Register at 1,807,816 gross tons for 637 vessels in total. This is far better number than the previous one on record, according to them, which was 1,748,507 tons for 547 vessels. “During this period, plans for 601 vessels, of 2,081,610 tons, were approved… these being the highest reached since the record year of 1920.”182 Further the society, gives a list of the total numbers of ships and the tonnage they comprised, that had plans which were approved for construction by the surveyors of the Lloyd’s Register. It starts at 1912 and the last year being the current for the report, 1930. It shows a clear rise in numbers, with 1920 being a peak year, with 1,299 vessels in total, with only 1922 and 1926 showing decline in number of ships, whereas the other years show consist range in numbers, with 1930, showing the highest number, at 601.183 In the next paragraph, under the headline “New Vessels Classed – where Built and Owned” a list is presented showing where the great majority of new vessels were being classed. Great Britain was listed having 439 vessels, totalling 1,210,597 tons, with Holland being the next in line with 38 ships, totalling 90,651 tons. Sweden had 23, which represented 91,394 tons and Belgium and France having 6 ships in total with 17,056 tons respectively for Belgium and 16,228 tons for France. The lowest number was 4, for Norway which comprised only 5,267 tons.184 In this section another list is given, stating for which country the majority of tonnage was built with UK being, again in leading place, with 982,181 tons for 349 ships and Yugoslavia and Honduras closing the list with respectively 12,741 tons for two vessels and 10,733 for two ships again.185

An interesting statement can be found in this report stating: “The total tonnage of merchant vessels afloat at the end of June, 1930, actually holding the classification of Lloyd’s Register, amounted to 32,412,608 tons, a figure which shows an increase of nearly a million tons over the previous highest total in June 1929.”186 Furthermore, 402 new vessels have been built under the Lloyd’s inspection with total of 1,977,628 tons, with view for their inclusion in the Register Book, which made for “…grand total of 10,364 vessels of nearly 34½ million tons…”187 in their words.

Anthony Burton calls the 1930s decade, the beginning of “The Long Decline”188, a good example he provides of this the John Brown’s shipyard. The yard was on a standby station during year 1932 to 1933, however the next year, 1934, saw a gradual pick-up of work from 3,758 to 9,583 by the eve of the Second World War in 1939. Burton, argues that this pattern of wages and employment bears some resemblance to what was going on during and immediately after the Great War, some ten years ago. The employment levels reached by John Brown at the end of this period, remained stable for the six years of the Second World War.189

181 Ibid., p. 5.
182 Ibid., p. 6.
183 Ibid., p. 7.
184 Ibid., p. 7.
185 Ibid., p. 8.
186 Ibid., p. 9.
187 Ibid., p. 9.
189 Ibid., p. 199.
Anthony Burton’s categorisation of the 1930’s as the start of “The Long Decline” is supported by the facts presented in the Annual Report for the period 1930-31, where we can find this: a noticeable fall in order placements for new vessels in the UK. The beginning of this decline began to be observed in the previous year, and has continued in the period in discussion in this particular report. “The plans passed by the Committee of Lloyd’s Register during the year show a reduction representing over 1,500,000 tons as compared with the previous twelve months.” The report is making a conclusion that this is a side effect of the Wall Street Crash in 1929 stating: “…the shipping industry in all its branches is at present suffering from the most severe depression within living memory.” Furthermore, they write that depression has deepened and spread in the past year. However, the tonnage of laid up ships doubled in that same period. Plausible explanation of this can be found in Appendix B, which explains the typical shipbuilding cycle. “The world total is now estimated at 10,500,000 tons gross; and there is no indication of an immediate improvement.” This statements is consistent with points 4 and 5 from Appendix B, which states “Freights start to decline, because large amounts of new tonnage usually become available just as the demand for shipping reaches a peak… After freight rates and price of new ships have been falling for an appreciable time, perhaps several quarters, large lines place orders, creating a small temporary increase in shipbuilding output. When these ships are delivered, however, freights fall further because the demand for shipping has not increased proportionally.” The total of gross tonnage of ships afloat in the world reached more than 70,000,000 tons, which represented an increase of 21,000,000 tons for the same period in 1914. However, according to the report most of the tonnage now laid up can be seen as an obsolete. Many of the older ships have fallen in value to the point of being valued at the rate of scrap metal and the price for scrap has drastically declined around this time. Due to this fact the number of vessels being scrapped and broken up is much lower. Even under existing conditions, however, the year’s total of vessels broken up amounts to about 1,000,000 tons gross.

Aside from this the society extended its activities in the sphere of civil aircraft inspection. The period 1930-31, represented the second year of the Society’s participation in the inspection of civil aircraft. That year the society took more activity workload and role in this field of inspection. “During the twelve months ended June last, the number of aircraft on the Society’s Register for the purpose of periodical inspection, under the authority of the Air Ministry, had been more than doubled.” The increasing workload in that branch, led to the employment of another Senior Aircraft Surveyor in the Society, Mr. G. H. M. Miles, late Technical Assistant to the Managing Director of Messrs. Imperial Airways Ltd. During this decade another important occasion occurred, in 1930 a venture called the National Shipbuilders Security Ltd was formed and funded by all surviving shipbuilding companies in order to reduce deliberately the surplus capacity. This, however, led to the suppression of many more subsidiaries and branch enterprises. “On the Clyde, the new shipyards built to augment the capacities of Ardrossan Dockyard, Barclay Curle and Fairfield were suppressed, whereas both Palmer’s and Armstrong’s lost a pair of branch yards on the Tyne along with their main establishments on the closure of the parent organisation.” Swan Hunter, closed down his yard based at the river Wear in Sunderland and the two facilities of William Gray were also closed down. This was the situation on the Northeast coast, similar thing was happening on the...
Clyde, as stated above. “Simultaneously, H & W pulled out of three of its subsidiaries on the Clyde, namely; the Caird, Henderson and MacMillan companies, while Lithgows’ transferred its Dunlop Bremner affiliate to National Shipbuilders Security. Finally, the Fairfield Company closed its Chepstow shipbuilder subsidiary Clydeside before losing its independence to Lithgows.”

In Arnold Hague’s view “Britain fights the next war in the same way as the last…” in 1939, this was the right tactic for the Royal Navy. Up to 1935 that meant if a war occurred with another European power the problem was to disrupt the enemy trade and prevent the enemy to the same. “The principle of blockade, preventing the egress of enemy fleets and causing his trade to have to pass through a concentration of naval power, was valid and persisted even in 1914 when distant blockade replaced close blockade.” The armed merchant cruisers were the preferred way of maintaining a distant blockade and guarding the need exit, two decades later, in 1939, the problem was largely the same, even though the circumstances were changed. “Added to their blockade duties was the relatively new one of contraband control on distant stations, caused by the increase in trade (over historical precedent), and anti-raider patrols on a larger scale than therefore.” At the time of 1939, the Royal Navy had in its disposal 50 such ships and six were allocated to the Commonwealth, making a total of 56 such vessels. 3 of these six were in Canada and the rest in Australia. “AMC were principally requisitioned in U.K. ports, though some were taken up in India, South Africa, Australia and Western Canada. Port of requisition was normally the fitting out port also, but not in all cases.”

Richard Osborne writes: “…the outbreak of the Second World War in 1939, Britain, France, Germany and later Italy, Russia, Japan and the United States of America once again set about the job of requisitioning and fitting out merchant ships for the familiar duties of blockade, contraband control, anti-submarine warfare, minelaying and minesweeping, in addition to the more mundane and less hazardous base and depot ship functions.” The most heavily armed auxiliaries were most often armed with up to nine guns which ranged from 6-inch to 4.7-inch bore diameter. The Germans employed their vessels for raider duties, while the UK had its ships as patrol and anti-raiders also as blockading vessels. The Italians had their ships used as ‘fighting escorts’ and had them armed with the weakest guns of all the nations. “The Japanese produced several AMCs/raiders but they made no significant contributions to the war effort, while the U.S.A. seems to have produced no ‘fighting’ conversions at all.” But no matter how advanced those auxiliary ship designs where they were still no match for a proper military vessel. “One sided-encounters such as those that occurred between RAWALPINDI and the battlecruiser SCHARNHORST and GNIESANAU and JERVIS BAY and ADMIRAL SHEER rightly become famous because they are outstanding examples of courage and devotion to duty. Similar actions which should not be forgotten include the Italian merchant armed cruiser ADRIATICO’s valiant but futile attempt to defend a convoy from radar equipped cruisers and destroyers of Force K on 1st December, 1941 and the mutually lethal action on 11th November, 1941 between the German raider KORMORAN and the Australian cruiser SYDNEY.” Another common wartime conversion was of paddle steamers to coastal AA gun platforms due to their shallow draught. They usually had locally controlled close-range rapid firing guns of 20 mm or 2 pdr. type that could be found, those guns were usually supplemented by machine guns. Rocket launcher could also be fitted to such platforms. These measures where taken due to the growth of the air power, whereas in the Great War the aircraft did not represent such a danger to the ground forces and shipping, during the Second World War the aircraft played much more important role. “Initially, all navies grossly underestimated the scale of the threat from the air only to find that they needed to take urgent remedial measures to protect all ships from...
air attack."\(^{209}\) As the battles dragged on this lead to increased revision to the treat of the air power, and also led to rethinking of what the auxiliary vessels role should be. The Royal Navy undertook a limited programme to convert some of the merchant ships as anti-aircraft gun platforms for escort duty of the Atlantic convoys. Another role in which auxiliaries where employed as was for amphibious landings, this happened more often when the Allies began to push back the conquest of the Nazi Germany and its allies in the second half of the war. “The art of amphibious warfare improved as the war progressed and thereby spawned a whole new range of mercantile conversions including headquarters ships, fighter direction ships, landing craft carriers, landing craft maintenance ships and even amenities ships in which troops could rest and relax in between operations.”\(^{210}\)

S. W. Roskill writes that “…as the skies over darkened”\(^{211}\) over the continent, the Admiralty started discreetly to implement the measure to counter the threat posed to Germany for naval dominance during August of 1939, a month before the official outbreak of the war. Roskill is mainly concerned with the Alfred Holt’s fleet, that is why he mainly tells their story. The fleet included eighty-seven vessels, which had gross tonnage totalling 701,891 tons. “These figures included not only the ships of the parent Ocean Steamship Company (O.S.S.Co.), founded by Alfred Holt in 1865, but those of the China Mutual Steam Navigation Company (C.M.S.N.Co.), the Nederlandsche Stoomvart Maatschappij ‘Oceaan’ (N.S.M.O.), and the Glen Line.”\(^{212}\) During the war the Ministry of Shipping, after 9\(^{\text{th}}\) of May 1941, the Ministry of War Transport transferred further forty vessels for operation to that company. Those ships came from various backgrounds from captured Vichy France vessels to the mass produced ‘Liberty’ class type ships. Of the 87 initial vessels 28 were pre-World War One or World War One built. From this we can see the power on which the Royal Navy could draw upon during wartime and to either draft some of those ships as auxiliaries, in the case of H.M.Ss Hector and Patroclus and the Antenor, plus the minelayers H.M.Ss Menestheus and Agamemnon, also Achilles, Ascanius and Centaur drawn from Alfred Holt’s fleet.\(^{213}\)

A Whitehall paper published on the 26\(^{\text{th}}\) of August 1939, outlined the pattern in which the British Merchant Fleet would be used for the next six years period. “It stated that the Cabinet Committee responsible for ‘Defence Preparedness’ had, in consultation with the Foreign Office and the Board of Trade, authorised the Admiralty ‘to adopt compulsory control of movement of merchant shipping which… should extend to Baltic, Dutch, Danish or Mediterranean Ports, and should include the routeing of ships in the Atlantic.’”\(^{214}\) The mobilisation callout came in on the 29\(^{\text{th}}\) of August 1939 at exactly 4.38 p.m. from the Admiralty to all naval authorities. It gave order to “…mobilise in accordance with Mobilisation Instructions for war with a European Power.”\(^{215}\) At the 1\(^{\text{st}}\) of September, several days later a ‘warning telegram’ was issued, and finally two days later at 11.00 p.m. on the 3\(^{\text{rd}}\) of September an order to ‘commence hostilities at once against Germany’ was given to the British Navy.\(^{216}\) However, as Roskill argues, those events came after many months or even years of meticulous planning. This facilitated smooth transition from peacetime governing of the merchant fleet to a wartime equivalent. “Firstly the owners had been told which of their ships the Admiralty intended to requisition for naval service… Secondly all the nation’s larger merchant ships had already been ‘stiffened’ at Admiralty expense to take defensive armaments…”\(^{217}\) The actual requisitioning and arming of the vessels had begun on the 26\(^{\text{th}}\) August 1939.\(^{218}\)

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\(^{209}\) (ed.) Richard Osborne; Conversion for War (World, Ship Society, Monograph no. 6, Kendal) p. 5.

\(^{210}\) Ibid., p. 6.


\(^{212}\) Ibid., p. 11.

\(^{213}\) Ibid., pp. 13-14.

\(^{214}\) Admiralty, Special Secret Branch Acquaint No. 39. The Powers conferred on the Admiralty were promulgated on the same day in the historic ‘Navigation Order No. 1, 1939’. This stated that ‘British merchant vessels at all times and Dominion vessels, when in British Territorial Waters, shall comply with any sailing or routeing instructions which may from time to time be issued by the Admiralty or by any person authorised by the Admiralty to act under this order’; from Ibid., pp. 19-20.


\(^{216}\) Ibid., p. 21.

\(^{217}\) Ibid., p. 21.

\(^{218}\) Ibid., p. 21.
Guns were left in ports that had enough capacity for refit of merchant ships, these ports were located mainly in the United Kingdom, however there were some overseas ports too. Those armaments available consisted mainly of six to eight 6-inch guns per ship and two 3-inch HA also. A simple fire control system was to be included in the package too. The system most often gave the bearing and elevation, in most cases, which was on a "follow a dial" system. "Normal method of mounting was to dispose the guns on the beam to give a broadside of 4 and chase fire of two guns. Some ships were capable of fitting only six guns, in others it proved possible to fit one gun on the poop instead of the after pair of economising on weight and weapons; there were also cases of five guns forward and three aft, two being on the centre line, but four guns on each beam was pretty standard." 219 The main supply of armaments were older types, that were no longer suitable for arming front line warships. Those were type produced in the 1890 and early 1900, which were utilising an old type of mounting, the P.III. Those mounting were removed from old warships and had limited 20 degrees elevation and up to 14,000 yards range. "This led to bitter complaint after the early actions with raiders whose 5.9-inch, although equally old, ranged beyond 14,000 yards so that the enemy simply opened the range and fired at will."220 As illustrated the German auxiliaries also employed older artillery systems, taken out of their old warships. Those armaments came from their pre-dreadnought battleships, the UK got their weapons from similar ship and also the Great War era C-Class cruisers. However, the German mounting were of more modern design or got updated so the range was greater than the British counterparts.221 The topic will be expanded in Appendix G, where more information of the mounting and armament is provided.

The immediate post-war period, especially 1946-47 saw the massive mercantile conversions to warships to be disposed, this was part of programme to limit down the strength of the Royal Navy. By the 1950s with the advance of the rocket technology it became apparent the fitting auxiliary ships with few old guns was not a proper way to lead a modern warfare. From this followed that the future of the auxiliaries in the modern navies would be limited to supply ships and troop transports.

An interesting wartime account could be found in the 1946’s publication "Build the Ships". It begins with a statement by Winston Churchill, Britain’s Prime Minister during the World War Two period: "Fill the Armies, rule the air, pour out ammunitions, strangle the U-boats, sweep the mines, plough the land, build the ships."222 This statement was given in 1940. "It would take months to visit all the shipyards in Britain."223 This is an interesting sentence that shows how far reaching was the shipbuilding industry hold on the island nation. "It would mean not only going mile after mile along the packed banks of Clyde and the Tyne, done the crammed ravine of the Wear; one would also spend days in the furnes of the Tees, in the fog of Birkenhead, the smoke of Barrow. One would have to take a plane to Belfast. This would simply be the beginning. For there are yards of the Scottish coast and the English Channel, the dozens of places on the estuaries and rivers where small pleasure crafts were built before the war. There are those inland factories where small ships and barges are made in sections."224 The wartime shipbuilding spread from the small torpedo and gun boats to the massive aircraft carriers who spread air power in sea, furthermore from the landing crafts made for infantry or tanks for the large merchant vessels made to carry cargo or oil. The author makes a note that the shipyards in the North East of England are in one of the most awkward places for shipbuilding by saying: "The slipways, you notice, have to be laid at an angle to the stream, for there is seldom room enough for a right-angle launch."225 Those were the shipyards were the majority of the global shipbuilding output was produced, with a great variety of specialised ships. "The most important wartime changes, however, came across the Atlantic in America where a crash building programme was initiated for the production of very cheap, basic standardized ships."226

219 (ed.) Richard Osborne; Conversion for War (World, Ship Society, Monograph no. 6, Kendal) p. 10.
220 Ibid., p. 10.
221 Ibid., p. 10.
223 Ibid., p. 17.
224 Ibid., p. 17.
225 Ibid., p. 17.
The assembly line principle was at play here, “… with sections prefabricated as units…” 227 Initially they were smaller 10-ton (10.16-tonne) blocks, however, as time passed those sections rose to the much bigger 200-ton a piece (203.2 tonne).

The unavoidability of a decline can be argued, by Lorenz, with greater force in the post-war period after 1945. “As Denison has pointed out, productivity growth for the economy as whole in Germany, France, and Italy benefited from the movement of a large portion of their work-force out of agriculture and self-employment into higher productivity industrial sectors. Britain, with only about 5 per cent of its labour force in agriculture in 1950, was precluded from benefiting from this type of productivity growth…” 228

The shipbuilding companies are in tenuous position because in order for them to stabilise the shipbuilding output it is necessary for the ship demand to be increased in a constant rate. “A decline in the rate of increase would lead to decrease in shipbuilding output even if the absolute demand for shipping services was still growing.” 229

The demand factors which play the most important role for the price of new ships, shipbuilders could enter a state of “profitless prosperity” 230. This is explained very well by a quote from Sidney Pollard and Paul Robertson in the Appendix B section of this project.

The Annual Report of the Lloyd’s Register was stopped for a period of twelve years (1938 to 1950) and the report for the years 1949-50 acts as an overview of what has occurred during this period. 231 On 25th March 1949 an agreement for the merging of the British Corporation and the Lloyd’s Register of Shipping was signed. This was a new beginning in the annals of ship classification, according to the Annual Report for 1949-1950 of Lloyd’s Register. This is what was written about this union: “The hope was then expressed that the union would be of lasting benefit to the shipping community, both at home and abroad, and it is gratifying to be able to record in this first annual report of the United Society that the amalgamation has been put into practical effect without inconvenience or detriment to its clients.” 232

In the Annual Report for 1949-50 a brief overview of the world conditions that might have affected the shipping industry were given. An emphasis was given to the two World Wars. The period immediately after the Great War was characterised in this overview as “…marked by easy optimism…” 233, whereas the post-war period after 1945 was given much more toned down: “marked by realism in shipping circles.” 234 Th society states that difficulties following the warfare were not ignored, but were managed and eventually settled. “The replacement of lost tonnage and the rebuilding of the world merchant fleet have not been deterred by unrest and uncertainty, but rather the reverse, and the 31,000 steamers and motorships which constitute the 84.6 million ton world fleet of 1950 are a far more efficient instrument of commerce than the 30,000 ships which made up the 68.5 million ton fleet of 1939.” 235

This speaks to the fact that the ships got bigger and for the roughly same amount of ships respectively during 1939 and 1950, the world tonnage had a difference of more 10 million tons. Furthermore, this statement argues the fact, that the ships got more efficient in the intermediate period. A similar thing that happened after the Great War happened in the post-1945 period, where the defeat nations fleet were drastically reduced. “The German, Italian and Japanese merchant fleets are only a fraction of their former size, and the United States of America now has the highest total tonnage registered under one flag, although a considerable part of it is in reserve and

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227 Ibid., p. 200.
230 Ibid., p. 27.
232 Ibid., p. 1.
233 Ibid., p. 2.
234 Ibid., p. 2.
235 Ibid., p. 2.
Britain by far has the largest merchant fleet in active employment.” However, a change occurred in the distribution of tonnage in the victorious nations, now USA had the largest amount, in contrast with the interwar period, however Great Britain still retain its dominant role in active merchant navy size. To meet the new demands the shipbuilding industry was compelled to produce more efficient ship designs, the Annual Report states.

An agreement with the Registro Italiano Navale was reached, that run along the same general outlines as it had before the outbreak of the Second World War in 1939. This was due to a policy upheld by the Society to work closely with other such classification society that had similar standards. “This agreement provides an important advantages for Italian owners who desire dual classification for their ships and enables them, with little inconvenience and expense, to obtain Lloyd’s Register class in addition to the obligatory national classification.”

In the five-year period from the end of the World War in 1945 and onwards, the disarmament had begun in the United States shipyards, employment numbers declined by a factor of 90%, and in the immediate post-war years it reached around 50%. “That level, in turn, is about one half of the wartime peak.” Out of 57 wartime shipyards 13 remained in operation in the 1970s, many of these shipyards were emergency creations for the war effort and were closed down at the end of the conflict. However, a number of these 57 yards were old-established companies and their closure was reflection of the changing market conditions. “The following conditions affected U.S. shipyards: cessation of extraordinary wartime needs for sea transport; gradual rehabilitation of Europe (particularly continental) and Japanese shipyards, as well as the industries which furnish the yards with materials and components.” The first condition was also true for the shipyards and the shipbuilding industry of the UK.

During the mid-decade, the Annual Report of Lloyd’s Register recorded a heightened shipbuilding activity throughout the globe, while some of the countries where claimed higher proportion of ‘export’ orders, the delivery dates were lengthened. Thus this was creating a more favourable balance in the competition innate in the industry. “During the year plans have been approved by the Society’s surveyors for 960 new merchant ships of 4,510,210 tons gross to be built to the classification of Lloyd’s Register of Shipping. This total is the highest peacetime figure on record and includes 565 ships of 3,019,230 tons to be constructed outside the United Kingdom. The orders placed are for both dry cargo ships and tankers and a feature of these orders is the continued growth in size and speed of ships in both categories.” From this follows that this period could be viewed as one of the starting point for the super cargo ships that now roam the world’s oceans. The Annual Report of the previous year, 1954, gave a big consideration to the structural standards of strength and safety in ship construction. The work has been steadily progressing, and the big push for 1955 was the developments in the new vessel construction. The tanker design was beginning to ‘crystallise’ into three categories, the smallest of which being the 18,000 ton vessel with length of about 530 feet, the mid-sized 30,000 to 34,000 tons with about 630 feet length and the last category of sizes

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238 Ibid., p. 4.
240 Ibid., p. 16.
241 Ibid., p. 16.
243 Ibid., p. 1.
244 Ibid., p. 1.
beyond this mark. In 1954 Report a remark was made of the growing size of the tanker vessels, which continued with accelerated rate during 1955 and a number of new tankers of 40,000 tons deadweight are undergoing construction in various shipyards or on the order books: “...four tankers of 52,000 tons deadweight are now under construction in France, to the Society’s classification. These ships are 780 feet overall length and have a beam of 102 feet. Even larger tankers are now completed.” These developments were precepted by the deepening of the Suez Canal in Egypt, which now permitted a greater draught of about 30,000 to 34,000 tons class of tankers to pass, which was deepened by 1 foot from 34 to 35 feet. “The design draught of the larger tankers has reached 38 feet 6 inches.”

In the mid-20th century, more specifically in the 1950s, a revolutionary change occurred in the shipping business, which also created major changes in the shipbuilding industry. That change was the introduction of the shipping container, its birthplace was in the United States of America during the aftermath of the Second World War. The reader may be wondering how this development is relating to Lloyd’s Register of Shipping or indeed to any other classification, however, as new ships were designed to handle the shipping containers, new rules for building and classifying them had to be devised. These changes of the shipping business, although starting in the USA, soon changed the whole landscape of the shipping on a Global scale.

Before we dive deep into the story of the container ship, we need to take a quick look behind the concept of containerisation in order to understand the development history of the container vessels and the thought process of Malcom McLean. The concept of containerisation may be described as system in which the goods are transported inside special uniform containers or boxes which can be easily carried by different types of transport, both land, sea or air and those containers could easily be transferred from one vessel to another. “The goods carried may be of any nature that will fit into the container and may be packages assorted or uniform sizes and shapes or a large single item, or may be of bulk or liquid commodities, or even cattle.”

On 26th April 1956 this concept was first put to the test, with the container ship prototype, the ‘Ideal-X’, a converted T-2 type tanker. However, we need to give a context to this statement, how and when the concept of ‘Ideal-X’ came about. “The concept that became container shipping was Malcom McLean’s. But in early 1955, when McLean jettisoned his plan to put entire truck trailers on Pan-Atlantic’s ships and decided instead to carry just trailer bodies, he could not simply buy the equipment off the shelf. Small steal boxes were readily available, but it was obvious that lowering them into the hold and stowing them amid assorted bags and bales, the way other ship lines occasionally did, would bring little by way of cost savings.” This presented McLean, with two conceptual problems as stated above, first the equipment he need did not exist and if he followed the example of other shipping companies he would not get a noticeable benefit. McLean needed an engineer to help him solve these issues.

All this meant that, when the container ship became popular and widespread in the 1960s, the Lloyd’s Register had to revise its Register Book to include the container ship in its classification. As the container ship had already started to change the landscape of the maritime shipping business around the globe. Furthermore, new rules had to be created and new safety standards be set into being.

Another development during the mid-twentieth century came on the heels of the Second World War, when oil in huge quantities started to be exploited in the Middle East region on a larger scale. The war which was a war of engines and machines required oil for fuel in amounts never before seen. “This led to oil becoming

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246 Ibid., p. 3.
247 Ibid., p. 4.
248 James J. Henry and Henry J. Karsch; Container Ships (Society of Naval Architects and Marine Engineers, 1972) p. 305.
250 Ibid., p. 48.
so cheap that the production of solid fuels stagnated, and in many cases was reduced to insignificance.”

Coal and coke began to be phased out in almost every form of transportation in favour of oil-based fuel products and natural gas for heating purposes. The countries without coal deposits had no other option except to start importing oil, like in the case of Sweden. “Except during the Korean crisis, oil prices… decreased in real value steadily and continuously right up to the great OPEC crisis of 1973…” In the 1950s right after the Korean War of 1950-1953 the oil production was increased by a factor of 7% per year in the ten period of 1955-1965. “Just after the end of the Second World War, a few international bulk-oil freighter companies began to build giant tankers to cater for the growing market. The American ship-owner, Daniel Ludwig, and two Greek owners, Onassis and Niarchos, had realised that the larger the ship built for carrying oil, the lower the transport costs. They had made the same discovery that the great shipbuilder, Brunel, had arrived at about hundred years earlier with his ‘Great Eastern’…” argues Jung.

The 1950s and the 1960s were a period marked by prosperity for the global maritime shipping trade and the shipbuilding industry, one of reasons for that was the establishment of a new credit system which allowed shipowners to purchase vessels solely on a credit base, where the credit was backed by government supported financial institutions. However, around this time it became evident that the widespread availability of shipbuilding credit allowed shipbuilding capacity and world fleet size increase that did not match the shipping requirements of the global business. “The new system did not contain the restraining influence of heavy caution present in the traditional system, and the high profits returned by shipowners attracted so many newcomers to the industry that the freight market collapsed in 1958.” The period right after this collapse, which lasted for six years, until 1964, saw a low demand during which the shipbuilding industry contracted and the shipbuilders struggled to sell their production, argues Riddle. Furthermore, he argues that credit schemes, where devised to relieve the crisis, despite the fact that the new credit system became one of the main factors in the industry’s struggle. These credits were seen as the solution to the low demand in other words. In 1963 the UK government introduced the ‘Marples Scheme’ when the shipyard situation in the country became critical, the credit scheme was meant to persuade the British shipowners ordering their vessels from British shipyards. “This scheme was oversubscribed by the end of the year, after which demand quickly tailed off.” 1965 saw the largest tanker ship classed by the Lloyd’s Register, its gross tonnage was estimated at 111,274 tons deadweight and it was a bulk tanker British Admiral. The tanker was constructed and built by Vickers in Barrow for BP. “Three years later, following the closure yet again of the Suez Canal, the Society classed the 190,000 tons deadweight Myrina built by Harland and Wolff, Belfast for Shell.” In view of the scale of shipyard closures and mergers, and furthermore in view of the Labour Government plans of privatisation of the shipbuilding industry, a thought was given to the matter of preservation of historical records to supplement the Lloyd’s Register of Shipping. This was to benefit historians, researchers and people with general interest in shipbuilding. “In the UK during the early 1970s, for example, 39 per cent of total turnover in shipbuilding was controlled by diversified companies, 38 per cent was in the hands

252 Ibid., p. 24.
253 Ibid., p. 24.
254 Ibid., p. 24.
255 Ian Riddle; Shipbuilding Credit (Bangor Occasional Papers in Economics, Number 20; University of Wales Press, 1983) p. 5.
256 Ibid., p. 5.
257 Ibid., p. 5.
258 Nigel Watson; Lloyd’s Register, 250 years of service (Lloyd’s Register; 71 Fenchurch Street, London, 2010) p. 72.
259 Ibid., p. 72.
of specialist private shipbuilders, while the rest 23 per cent was controlled by state, specialist shipbuilding enterprises.\textsuperscript{260}

The Chairman of the Society, Sir Anthony C. Grover argued that more changes occurred between 1960 and 1969, than in the previous two hundred years. ”Containers, control engineering, super-size vessels, catamarans, hovercraft, LNG carriers, offshore rigs – these were just some of the innovations which would set the scene for the next generation.”\textsuperscript{261} This was all stimulated by the growth of the global shipping business, in that same period the tonnage rose from 101 million to 153 millions gross tonnage, and at the time of the 1976 crisis, in which the boom turned to bust, merchant fleet of the world had totalled to 371 million tons.\textsuperscript{262} This would not occur again for two decades, until the latter half of the 1990s.

Another aspect of the 1970s was the growing demand for energy, it was complicated by the uncertainty generated in the major energy suppliers in the Middle East. By the end of the decade, in 1978, two ULCCs were classed the Nai Superba and Nai Genova both having 409,000 tons deadweight. The composition of the classed vessels by the Society was clear development. The first successful oil-bulk-ore carrier vessel was classed in 1965, it was the Naess Norseman constructed at Germany and being 71,000 gross tons. The Lloyd's Register classed some 60 million tons aggregate which belong to some 10,000 ships. “…1984, although the number of ships had fallen to 9,000, the aggregate tonnage had risen to 104 million tons.”\textsuperscript{263} This led to many technical and practical difficulties, due to the extraordinary growth of tonnage of the oil and container ships. This was shown by the loss the Derbyshire in 1980, it was built as the 91,655 tons OBO called Liverpool Bridge by the UK company Swan Hunter in 1976. When she sank it was the biggest British merchant vessel lost at sea with 44 lives. She was lost during a typhoon Orchid in the South China Sea. An enquiry carried out in 2000, when the wreck was located, concluded that vessel sunk due to structural failure. “The hatch covers, built to standards considered safe at the time, had proved unable to withstand the pressure of the giant waves created by the typhoon. This was a lesson in the value of thorough investigation and continuing research.”\textsuperscript{264} At the time of this maritime accident an average of 17 bulk freighters were lost at sea annually. A decade later, during the 1990, this led to considerable research by the Association of Classification Society. The Lloyd’s Register lend its close support to the work which provided a revised rule for the construction of such ships.\textsuperscript{265}

During the 1970s there was an attempt at changing the way the society was governed. During 1975, the Society became an incorporated industrial society, putting an end to century and a half of unlimited personal liability for the members of the General Committee. “The idea of Frank Vickers, the Financial Controller, this also gave the Society tax exempt charitable status, granted by the authorities on the basis that the primary purpose of Lloyd’s Register was the enhancement of safety.”\textsuperscript{266}

1981 was a favourable year for the domestic energy market, the production of the North Sea oil company surpassed, for the first time, the domestic energy requirements. This boom sustained the Lloyd’s Register through difficult years for the shipping business. This was concluded after a 1978 Annual Report of the Register, which stated that ‘the situation for shipping is probably the grimmest in post-war history.”\textsuperscript{267} Nigel Watson argues it was the old problem, that there were too many ships in existence and not enough orders for them all. During the 1980s the world fleet shrank, as many ships were sold and scrapped. During the 1980s brought significant change to the management of the overseas operations, after the 1960s when a lot of new National Committees were created. Countries started to be grouped into regions “…in 1984 these were North Africa, the Middle East, the Southern Orient, the Central Orient, India and Sri

\textsuperscript{261} Nigel Watson; \textit{Lloyd’s Register, 250 years of service} (Lloyd’s Register; 71 Fenchurch Street, London, 2010) p. 72.
\textsuperscript{262} Ibid., p. 72.
\textsuperscript{263} Ibid., p. 73.
\textsuperscript{264} Ibid., p. 75.
\textsuperscript{265} Ibid., p. 75.
\textsuperscript{266} Ibid., p. 77.
\textsuperscript{267} Ibid., p. 77.
Lanka, Bulgaria, Romania and Turkey, the USA, Australia and the Nordic countries – each under a Regional Manager. By the start of the 1980s, the Register had 243 offices in 60 countries and employed a staff numbering 3,500. The society was involved in out statutory load line surveys in more than 100 countries and around 80% of its income was generated outside Great Britain.

PART III

The XXIst century: Vision of the Register; Big Data; How to go about shipbuilding research
Technology of the ship and technological changes; Economic research; Shipbuilding credit

The vision of the Lloyd’s Register is to be recognised as leading support of engineer-related training, education and research globally. They believe this is making a difference in the safety of critical infrastructure on which our modern society is relied upon.

In their December 2014 report ‘Foresight review of big data’ is the Lloyd’s Register argues that computing power and the data volume that are generated were increasing by several factors. For this it was necessary that the Lloyd’s Register Foundation to learn and grasp what the concept of big data is. To that end the Lloyd’s Register Foundation wrote in their report that the Register was built on data, and when the first register was published for the first time three centuries ago, in 1764, it provided data on ship quality and people who used and analysed the data provided used it to manage the shipping risks and to understand them. They further state that the infrastructure is far more complicated than that of the 1764, so the big data and the rest of the advanced analytical tools that exist today would address that problem. “From cradle to grave, design to decommissioning, big data will analytics will feature at all phases of the life-cycle of engineering systems, and will inform new developments as part of an iterative process.” The value would be created by analytics from wide circle of new innovations, that will inform not only machine performance and assets but they will connect with the social, economic, physical and the human environment in which they exist. The big data has been described as having four dimensions: volume, velocity, variety and veracity. “Data that is extraordinary in one or multiple of these dimensions – very large amounts, rapidly streamed, heterogeneous and/or uncertain – may be called big data.”

According Mack-Forlist and Newman there were four stages of the ship design activities. The first step is the basic studies, then follows preliminary design, the third stage is to contract plans and specifications and finally to produce working plans and procurement specifications. The first stage, the basic study, is mostly concerned with economic evaluations of the proposed ship in most cases and is done by a designer or the owners. The next stage is generally a work of an independent naval architects and marine engineers or in some cases by shipyards, they produce the preliminary and contract design. The third step, the working plan is in most cases developed by a shipyard and is on approval by the owner’s design agent. “All stages, except the first, require the approval of the several regulatory agencies including, in cases of subsidized ships, the Maritime Administration.”

268 Nigel Watson; Lloyd’s Register, 250 years of service (Lloyd’s Register; 71 Fenchurch Street, London, 2010) p. 78.
270 Ibid., p. 7.
271 Ibid., p. 8.
something of an international regulatory institution, it also needed to give its approval on the proposed ship plans.

The main factor for the national shipbuilding industries to stay viable is the technological innovations and changes. "In concert with world trade, it is instrumental in boosting the profitability of some shipbuilders while inhibiting the competitiveness of other."274 In Todd’s view there are two types of shipbuilders, the ones who become innovators and set the way of the industry and the other are abiding by constrictions of technological laggards. The innovators are controlling the majority of the shipbuilding market and compel the rest shipbuilding company to react to their changes and innovations, if for no other reason just to stay in the business of ship manufacturing. “The new technology which underpins the success of the interlopers: either by forming, with government help, a market immune from the influences of the technology leaders, or through belated attempts, again with government assistance, to adjust to the rigours of the new technology…”275 argues Todd. The first choice means that the national shipbuilding industry would eventually stagnate due to a lack of new technological developments to keep it ahead of competition from other states and then eventually it will start to lose positions on the global market, which would in turn lead to its contraction which would create big social strive, such as job losses. The second option is not much better; however, it at least provides for the industrial complex to stay in business and minimise the loss of the lag behind other countries which may have gained new technological advances first. Todd’s thoughts on this topic are as follows: “…technology is a crucial supply factor which affects all manner of production from quality of capital plant, site layout, and shipyard size to quality and use of labour. Moreover, in its product innovation form, it has a direct effect on demand too.”276 The nineteenth century was marked by industrial organisation changes, which followed on the heels of technological developments such as the transition from wood to iron and steel and also the move from sail to steam engine power, which created the need to expand the shipyards into full factories and also made demands for an expansion of the workforce which worked them. The workforce needed to be more made more skilled to allow for the more complex tasks that were now essential for a modern shipyard and to allow reaching the necessary standards for safety of the vessels being produced. The next century, the twentieth was marked by further reorganisations this time they were more technological as the ways of manufacturing become more complex, the ship size tendency of getting bigger which started in the mid-nineteenth century transitioned into the twentieth century, when by the 1960s new massive vessels began to produced, they were called the super tankers and container ships. These ships further made demands on the industry to become more technological than in previous periods. The propulsion systems became more complex as the ships got bigger and faster throughout the decades of the twentieth century.

The shipbuilding databases, such as Lloyd’s Register or British Shipbuilding Database, are like a fundament for the historian or the researcher, who has a genuine interest of shipbuilding, they proved the layout and they can direct in search for sources. However, the context is found in other, supporting sources, be it archival documents of a certain shipyard or historical account. That is why the Lloyd’s Register of Shipping is and should be an integral part of any research into shipbuilding, with its long history spanning few centuries. Lloyd’s Register also was the driving engine for a few of the developments that occurred in the shipbuilding industry in the United Kingdom. A testament to this is the fact that ship plans were submitted for approval to the Committee of the Lloyd’s Register before actual construction began and Society Surveyors were present at the building stages to ensure the vessel was built according to their standards.

The Lloyd’s Register Annual Reports can show also economic currents such as upsurges or depressions. These reports can do this by viewing the figures of ships built in certain period of time or projects submitted for review by them. Thus, they can see the current economical state in certain part the world or the United Kingdom.

275 Ibid., p. 143.
276 Ibid., p. 143.
Ian Riddle writes that the widespread availability of shipbuilding credit did not happen until the 1950s. “Before that time the relatively slow growth in world trade allowed shipowners to accumulate the resources necessary to make each new investment; thus the establishment of an independent shipping fleet was generally a lifetime’s work beginning with the purchase and operation of an ageing second-hand vessel and gradually improving the quality and size of the fleet from accumulated trading profits.”\textsuperscript{277} The expansion requirements created by the astonishing growth in the global traded during the period of the 1950s and 1960s was one of the reasons, why the credit system which was appropriate for the past two millennia was abolished. Japan became the first countries to establish a credit system in which shipowners could acquire new ships on a credit basis and the supplier of that credit were government-backed financial institutions. “Other governments followed suit, and the result was a period of prosperity for shipowners and shipbuilders alike, coupled with a rapid increase in the size of the world fleet and shipbuilding capacity.”\textsuperscript{278}

Riddle asks the question: “But are credit schemes effective in stimulating total orders under any market condition?”\textsuperscript{279} He proceeds to give us his answer to the this problem: “The precise degree of influence can never be determined, as shipbuilding demand is a function of many factors, including price, foreign exchange rates, quality, delivery time and credit, all of which can be swept to one side by a wave of shipowner’s optimism produced by a rising freight market.”\textsuperscript{280} Riddle also provides the view of the Economist magazine by saying that the credit schemes are effective stimulators of demand.\textsuperscript{281} “For many deals the financial package offered is an important as the technical excellence of the product itself or even its price.”\textsuperscript{282}

**Conclusion**

Lloyd’s Register website has a section in which digital copies of the Register Books are contained. However, not all of the Register Books were digitised, as it is claimed. The volumes dated up to 1899 where by “The Internet Archive” by “Googlebooks”.\textsuperscript{283} “The Registers for 1930-1945 were digitised as part of the Plimsoll ship data project by the Southampton City Libraries and Archives Services in conjunction with Lloyd’s Register’s Heritage & Education Centre. The fields can be searched by ship name(s), year of build and gross tonnage.”\textsuperscript{284} The earliest preserved example of Lloyd’s Register Book is dated 1764, it is was published just four years after Lloyd’s Register was established. “The Register Book for 1764-66 is now available to view in PDF format. Vessels can be found in alphabetical order of ship name. This is the first time that pages from this original edition of the Register of Ships 1764 have been made available online. The only surviving volume is on permanent loan to the British Library.”\textsuperscript{285} This is also confirmed in the “Annals of Lloyd’s Register” from 1934, where the authors stated, that the oldest copy is from 1764-65-66. This copy was held at the library of Lloyd’s Register Office in Fenchurch Street. “It is of an oblong form, differing in this respect from all the succeeding volumes, and its singed edges bear evidence of having passed through the flames.”\textsuperscript{286} Following this, we can claim, with great relief, that we are indeed fortunate to have preserved this unique example of the early days of the Society.

\textsuperscript{277} Ian Riddle; *Shipbuilding Credit* (Bangor Occasional Papers in Economics, Number 20; University of Wales Press, 1983) p. 5.
\textsuperscript{278} Ibid., p. 5.
\textsuperscript{279} Ibid., p. 5.
\textsuperscript{280} Ibid., p. 5.
\textsuperscript{281} Ibid., p. 5.
\textsuperscript{282} *The Economist* 14.02.1981 from Ibid., p. 5.
\textsuperscript{283} Lloyd’s Register Foundation Heritage & Education Centre; https://hec.lrfoundation.org.uk/archive-library/lloyds-register-of-ships-online; accessed: 10/07/2019 at 14:56.
\textsuperscript{284} Ibid.; accessed: 10/07/2019 at 14:56.
\textsuperscript{286} *Annals of Lloyd’s Register, Centenary Edition, 1934* (Lloyd’s Register of Shipping, 71 Fenchurch Street; London; 1934) p. 7.
The topic of the shipping databases is a very interesting field in Information and Library Science. They have a very long history, especially in the face of the Lloyd's Register of Shipping, which has a history of more than two and half centuries. It started as Underwriters register and throughout its long history it become international body which sets out rules and regulations for the shipbuilding industry. It survived many crisis periods in its history, such as the period of the rival registers, which ended in 1834 with the creation of the modern Lloyd's Register of Shipping. It also survived two world wars, where the register played an important role. In the interwar period, the Lloyd's Register branched out in the civil aviation sector, and after 1945 it became involved in the energy industry. Now in the new twenty-first century Lloyd’s Register Foundation, continues the story alongside the Lloyd's Register of Shipping by exploring modern ways of information management. One of those ways is looking into the subject of big data.

Another aspect of this register is the historical, it can be seen as one of the most valuable sources of information on the history of the British shipbuilding industry. During the 1970s attempts have been made to create databases concerned with the shipbuilding, however, none of these attempts can compete with Lloyd’s Register of Shipping longevity and dept of information gathered in its database. This project is aimed at shining a spotlight on an intriguing part of the LIS subject, that of the industrial databases, and particularly those of the shipbuilding and shipping industry.

**APPENDIX A**

This section represents a glossary of some of the terminology that is needed to understand more deeply the topic of shipbuilding:

**Underwriter & Underwriting:**

Before we move any further, we believe it is prudent to clarify some terminology, so as to understand better the topic before we dive into it. The first term and one of the more important is underwriter. Underwriter, is a person who insures wholly or fractionally vessels and/or the cargo they are carrying. Accordingly underwriting is the act of an underwriter, “…i.e. undertaking to ensure marine risks.”

**Surveyor:**

Moving from the insurance sector, we encounter the surveyor. Surveyor, according to *Glossary of Marine Technology Terms*, is “…official of a classification society or Department of Trade who reports that a ship and the machinery conform to the standards of the rules of the society and recommends Certificate of Class to be issued.”

**AMC/MAC – Armed merchant cruiser/Merchant Armed Cruiser.**

**Bunker costs** - Fuel costs.

**Containerization**

is a system by which cargo is transported within uniform van-containers interchangeably by different forms of transportation. The container ship is a water-borne link in this system. The van-container molds the

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288 Ibid., p. 273.
290 (ed.) Richard Osborne; *Conversion for War* (World, Ship Society, Monograph no. 6, Kendal) p. 70.
291 Ian Riddle; *Shipbuilding Credit* (Bangor Occasional Papers in Economics, Number 20; University of Wales Press, 1983) p. 83.
cargo to a standard shape and container ship’s cargo space is cellular to accommodate the containers. Containers are stowed aboard a container ship in vertical stacks within each of many cells requiring only vertical movement in and out. Hatches are of extreme dimensions to accommodate the maximum number of cells. The ship’s structure requires a special design and arrangement to suit the container cells. Hardware includes cell guides centering and precentering fittings, and special shore or shipboard cranes. Containers stowed in several tiers high above the deck expand the vessel’s capacity and require additional hardware for securing and lashing in place.\textsuperscript{292}

**Demurrage**

Compensation for undue delay at port of discharge.\textsuperscript{293}

**Drawdown**

A clause in the construction agreement allowing the buyer to cancel his order and demand full repayment if the vessel is not delivered by a specific date.\textsuperscript{294}

**OBO**

Oil-bulk-ore\textsuperscript{295}

**OPEC**

The abbreviation means: ‘Organization of the Petroleum Exporting Countries’\textsuperscript{296}

**Panamax**

A ship built to the maximum size permissible for passage through Panama Canal.\textsuperscript{297}

**The craft system**

Term proposed by Edward H. Lorenz in his book from 1991, which describes the institutional arrangement which gave the British shipbuilding industry advantage on the world shipbuilding marker during the period of 1890 to 1910. This system gave the British producers adequate supply of skilled shipyard labour force which had enough experience to co-ordinate its tasks without managerial interference.\textsuperscript{298}

**Tramp**

A cargo ship not on a scheduled route. \textsuperscript{299}

\textsuperscript{292} James J. Henry and Henry J. Karsch; *Container Ships* (Society of Naval Architects and Marine Engineers, 1972) p. 305.

\textsuperscript{293} Ian Riddle; *Shipbuilding Credit* (Bangor Occasional Papers in Economics, Number 20; University of Wales Press, 1983) p. 83.

\textsuperscript{294} Ibid., p. 84.

\textsuperscript{295} Nigel Watson; *Lloyd’s Register, 250 years of service* (Lloyd’s Register; 71 Fenchurch Street, London, 2010) p. 73.


\textsuperscript{297} Ian Riddle; *Shipbuilding Credit* (Bangor Occasional Papers in Economics, Number 20; University of Wales Press, 1983) p. 85.


\textsuperscript{299} Ian Riddle; *Shipbuilding Credit* (Bangor Occasional Papers in Economics, Number 20; University of Wales Press, 1983) p. 86.
Worldscale

A schedule of freight rates intended to produce the same daily revenue irrespective of the voyage performed. Variables such as bunker charges and port dues are allowed for in accordance with the schedule devised and revised by a regulating organisation. 300

APPENDIX B

Typical shipbuilding cycle

As described by the economists who have studied the phenomenon, a typical shipbuilding cycle might proceed as follows:

1. As freights begin to rise, old vessels that might have been laid up during the preceding slump are reactivated and, after a lag of a quarter or two, orders for new vessels are placed in anticipation of further improvements in demand.
2. If freights continue to rise, more orders are placed. Because of the time necessary to construct a ship, however, freights have been raising for some time before a substantial amount of new tonnage is ready for service.
3. When new tonnage begins to be placed in operation, increases in freights slow down, but, because a large proportion of buyers can afford to purchase a ship only after they have already profited from high rates, some new orders continued to be placed.
4. Freights start to decline, because large amounts of new tonnage usually become available just as the demand for shipping reaches a peak. Older and less profitable ships begin to be laid up.
5. After freight rates and price of new ships have been falling for an appreciable time, perhaps several quarters, large lines place orders, creating a small temporary increase in shipbuilding output. When these ships are delivered, however, freights fall further because the demand for shipping has not increased proportionally.
6. When enough ships have been laid up and the demand for shipping services increases, freight rates rise and cycle begins again. 301

APPENDIX C

"The Old Book has about 180 Subscribers, at eight guineas each, and twenty guineas each from the Royal Exchange and London Assurance Companies, which gives, as I assume, an income of £1,550; the New Book has about 126 Subscribers, at the same rate, and with two similar donations, realises about £1,080. If, instead of two, only one Book was published, and that on a principle which would combine general approbation, the aggregate number of Subscribers would, I conceive, be much increased, and the ability to pay fit and competent Surveyors and other necessary and efficient officers of the establishment, proportionally augmented. The number of vessels registered in the Old Book is, in round numbers, at about 14,450; the New one about 13,950; and upon so numerous a Marine, a revenue might, in my opinion, be raised, without any undue pressure on its Properties, fully adequate to the expenses of an establishment, in all respects efficient for its object." 302

It is of special interest to record the opinion of the eminent Shipbuilder, Mr. Robert Napier, of Glasgow, who replied to the Committee’s circular in the following terms, viz.: -

300 Ibid., p. 86.
302 Annals of Lloyd’s Register, being a Sketch of the Origin, Constitution and Progress of Lloyd’s Register of British & Foreign Shipping, 1884 (Lloyd’s Register of Shipping, 2 White Lion Court, London, 1884) p. 30.
“I have, like your Committee, the most earnest desire to see Iron Ships built on the strongest and most scientific principles. I am very sorry at being under the necessity of stating that I cannot see any way of filling up your Questionnaire satisfactorily, as I consider the subject so involved with practical difficulties that it would be impossible to make Rules to meet the different cases honestly, and so as not to do much injury to this new and growing branch of shipbuilding trade.”

“Considering that Iron Shipbuilding is yet in its infancy, and that there are no well-understood general rules for building Iron Ships, the Committee have not deemed it desirable to frame a scheme compelling the adoption of a particular form or mode of construction; but that a certain general requirements should be put forward having for their basis the thickness of plates and substance of frames, showing a minimum in each particular, to entitle ships to the character A for a period of years, subject, however, to certain periodical surveys; and also to a continuation of such character, should their state and condition justify it on subsequent examination. For the purpose of attaining this object the following Rules and the accompanying Table of Dimensions have been formed.”

“At the time the Committee drew up the first Rules in 1854, they felt that a classification of six, nine and twelve years, although it might approach the truth as to the probable comparative durability of the various kinds of timber of which such ships were allowed by the Rules to be built, yet these characters could not correctly indicate the durability of vessels built of metal, which only deteriorated by the wasting of the surfaces, and whose durability depended upon different laws of that of timber.”

“It should be borne in mind that, although the mode of constructing iron ships primarily intended by the Society’s Rules is the original ordinary one of vertical frames and longitudinal plating, the Committee do not hesitate to admit into the Register Book and into the same classes, vessels otherwise constructed, if equal of strength; and they have classed ships with longitudinal frames or with diagonal frames, and many with double or cellular bottoms for water ballast.”

APPENDIX D

“LLOYD’S REGISTRY OF SHIPPING,
Castle Court, Birchin Lane,
January, 1829.

“The Committee beg leave to remind the Subscribers that when this Society was established, in the year 1760, the Annual Subscription was Twelve Guineas.

“At the end of Half a Century, their funded Property having increased to £12,000 Stock, the Price of the Book was reduced one-third, viz., from Twelve to Eight Guineas; but the expenses for the last Twenty Years having exceeded the Income by nearly £500 per Annum, and the Stock now remaining accounting only £2,000, the Committee under the necessity of raising the Price of the Book this Year to Ten Guineas.

“Nearly Ten Thousand Vessels are surveyed every Year; the expense of Survey, by competent judges, cannot be reduced under the present Salaries, which exceed £1,000 per annum, rather under 2s. 1¾d. each vessel.”

303 Annals of Lloyd’s Register, Centenary Edition, 1934 (Lloyd’s Register of Shipping, 71 Fenchurch Street; London; 1934) p. 82.
304 Ibid., p. 83.
305 Ibid., p. 84.
307 Ibid., p. 46.
APPENDIX E

At the request of the Manager of the Barrow Haematite Steel Company, four experienced Surveyors on the Society's Staff visited the Works and conducted experiments on the steel production there; and, as a result of their report, the Committee resolved

“That ships built of steel of approved quality under Special Survey should be classed in the Register Book, with the notation of 'Experimental’ against their characters. The specification for the ships must, however, be submitted to the Committee for approval.

“That a reduction be allowed in the thickness of the plates, frames, etc., of ships built of steel, not exceeding one-fourth from the prescribed in Table G for Iron Ships. In other respects the Rules for the construction of Iron Ships will apply equally to Ships built of Steel.

“That the steel must be equal to a tensile strain of not less than 30 tons to the square inch.”

APPENDIX F

Special Work of Lloyd’s Register of Shipping during the Great War /1914-1918/

In addition to the Society’s ordinary business of the survey and classification of merchant vessels at home and abroad the following, amongst other special work, has been undertaken, namely :-

The Special Survey during construction of Standard vessels.

The Special Survey during construction of vessels for Admiralty and War Office.

The inspection and testing of War Material in the United State for the British Government.

The inspection and testing in this Country of War Material for the French Government (including over 1,400,000 tons of shell steel).

Condition Surveys on requisitioned vessels.

Survey of vessels surrendered by Germany under the Peace Terms.

The Survey of Cold Stores.

APPENDIX G

Three different dates can be quoted for the take over of each ship and all are correct:

1. actual requisition date
2. commissioning date which, for legal reasons, was normally the date of commencement of fitting out
3. completion of initial fitting out.

Whatever the means, over the period 1870 to 1939 Britain ensured that there was an adequate pool of suitable vessels of good endurance, stiffened for armament, available under the national flag. In the main they comprised the intermediate liner type of around 15,000 tons, mainly steam and oil fired, and self sufficient in water taking into account the reduced complement as AMC. Fifty-six such ships were taken up across the world in 1939, fifty directly by the Royal Navy, and six by the

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Commonwealth (3 by Canada and 3 by Australia), one of the R.N. ships being New Zealand manned in the final event. They are... classified as:

1. Oil fired steam ships
2. Coal fired steam ships
3. Diesel engine ships.

Oil fired, Steam
ALAUNIA
ALCANTARA
ANDANIA
ANTENOR
ANAWA
ASCANIA
ASTURIAS
AURANIA
AUSONIA
CALIFORNIA
CANTON
CARINTHIA
CARTHAGE
CATHAY
CHITRAL
COMORIN
CORFU
ESPERANCE BAY
FORFAR
HECTOR
JERVIS BAY
LACONIA
LETITIA
MOLOJA
MONOWAI
MONTCLARE
MOOLTAN
MORETON BAY
PRINCE DAVID
PRINCE HENRY
PRINCE ROBERT
QUEEN OF BERMUDA
RAJPUTANA
RANCHI
RANPURA
RAWALPINDI
SCOTSTOUN
TRANSYLVANIA
VOLTAIRE
WOLFE

Coal Fired, Steam
LAURENTIC
PATROCLUS
Diesel Engined
BULOLO
CARNARVON CASTLE
CHESHIRE
CILICA
CIRCASSIA
DERBYSHIRE
DUNNOKTAR CASTLE
DUNVEGAN CASTLE
KANIMBLA
MANOORA
PRETORIA CASTLE
SALOPIAN
WESTRALIA
WORCESTERSHIRE

"British mounting were, in the main, the P.III and later P.XVII versions, using the Mk. VII 6-inch gun, with a sprinkling of CP. XIV mounting later in the war. The original P.III elevated to only 14 degrees, as did the P. VII and in both cases ranged out to 11,900 yards. This was increased to 14,200 when the elevation was increased to 20 degrees. Two ships, LAURENTIC and MONTCLARE, were unique in mounting 5.5-inch guns and were in consequence probably the best armed of the initial conversations in view of the relative modernity and longer range of the gun mounting (16,000 yards). Only one R.N. AMC, CHITRAL, was better equipped initially, her guns capable of 18,500 yards because of more modern mountings."

APPENDIX H
Indexing methods adopted by Lloyd's Register of Shipping

A co-ordinate system with edge-punched item cards has been in use at Lloyd's Register of Shipping for about fifteen years, for indexing their surveyors' reports.
More recently they have, adopted, the same principle but with body-punched feature cards for indexing general technical literature. For this, a list 427 descriptions or features, had been drawn up. The feature cards, which have ten thousand item positions, were specially designed and made in plastic material, and a special punching device has been developed.
The system… has been in satisfactory operation, for about four years, and contains over 18,000 entries.

310 (ed.) Richard Osborne; *Conversion for War* (World, Ship Society, Monograph no. 6, Kendal) pp. 8-9.
311 (ed.) Richard Osborne; *Conversion for War* (World, Ship Society, Monograph no. 6, Kendal) pp. 10-11.
Dissertation Proposal

Working title: Shipbuilding Databases, the case of Lloyd's Register of Shipping

Dissertation Supervisor: Dr David Bawden

Introduction
The aim of this proposal is to show what literature would be used to examine and answer the proposed topic. The topic at which this project would be looking is the database that is the Lloyd’s Register of Shipping. The project would investigate how this database tried to keep track of most of the merchant shipping and shipbuilding activity of the United Kingdom, from its’ creating in the mid-1700s. However, due to volume constrains, the emphasis would be on the twentieth century. However, the project will briefly look at the previous historical periods. The form of research that this project will employ would be desk research, supplemented with historical and content analysis of shipbuilding databases, more specifically Lloyd’s Register of Shipping.

Ethics
As the project is mostly desk research it is the authors believe it does not breach any major ethical considerations or issues. However, wherever appropriate the necessary ethical check should and would be followed by the author. The project does not intend to do any interviews for the purposes of answering the proposed question, most of the work would be done by attending archives and examining written documents. However, if acquiring or finding sensitive information and documents the appropriate procedures would be kept.

Scope and definition
The scope of this dissertation would be the Lloyd’s Register of Shipping, that is the database of all shipbuilding output of the UK ship manufacturers. Register books were completed annually by classification societies under the Underwriter’s Registry since 1760, however a century later, in 1834, the registry was transformed into Lloyd’s Register of Shipping, write Buxton, Fenton and Murphy. The register started to be published annually since 1775. A century later the Lloyd’s Register aimed at including all merchant shipping over the mark of 100 gross tonnes which are also sea worth and self-propelled regardless of the classification assigned, until this period only ships that were classed by the Lloyd’s Register of Shipping were included. However, the Lloyd’s Register is not official record of shipping registration, the official registration is the responsibility of the Registry of Shipping & Seamen based in Cardiff. Initially the ships which were included were classified and surveyed by the Lloyd’s Register. However, with time the coverage expanded and ships which were not classified by the society members began to be included. “From 1834 to 1837 all British ships over 50 tons were listed, although listing thereafter reverted to classed ships. From 1875 all UK and major foreign ships of over 100 tons were included, and from the 1886 Universal Register all ships over 100 tons were listed.”

Aims and objectives
As it would be very difficult to examine all of the major shipbuilding ports that were included in the Lloyd’s Register of Shipping for United Kingdom, the essay will focus more on the English shipbuilding ports and companies, rather than their counterparts in Wales and Northern Ireland. Particular focus would be paid on the areas of the river Clyde, near Glasgow in Scotland and the rivers Tyne and Wear, near Newcastle and respectively Sunderland located in North East of England. Such attention would be paid to these three ports as they were one of the major shipbuilding regions of the United Kingdom and were responsible for most of the merchant shipbuilding output. This is particularly true for the shipyards at the River Wear near Sunderland, as most of the shipyards around Newcastle and Glasgow produced military vessels alongside merchant vessels.

Research context
A good question to ask is why we should be researching this topic? The aim of this project is to show how a database could be used to measure and keep and record of particular industry, in our case that of the shipbuilding industry of the United Kingdom. One of the main measurements is the tonnage output. Tonnage output means the total weight of the ships produced. As to why, the project is concerned with Lloyd’s Register of Shipping is because the register is concerned with one of the most important shipbuilding industries of the world, as Buxton, Fenton and Murphy argue before the First World War the industry was responsible for launching around 60% of the total tonnage in the globe.315 Furthermore, the topic is also important for the aspect of Library and Information Science due to the ways the records and data in this database are managed, both historically and nowadays. What record management systems were used and how and their evolution throughout the long history of the Lloyd’s Register of Shipping. As Buxton, Fenton and Murphy argue despite the publishing of multiple historical volumes of Lloyd’s Register of Shipping, a failure to explain the how the compilation of statistics worked in the register.316 So, one of the tasks of this project would be to try and find out the logic behind how the data statistics are collected. Furthermore, by examining the Lloyd’s Register of Shipping, this project will show the importance of databases, such as Lloyds, which are recording the output of different industries which operated in the UK. Another aspect of this task would be to help further research into the sphere of industrial specific databases. Finally, it would also provide further base for historical researche on the shipbuilding industry in the UK.

The project will employ a number of sources, ranging from archival materials and documents to academic works such as books and journal articles relevant to the topic we examine. As their official website advertises the Lloyd’s Register Group Limited is not only a register, but “…a leading international provider of classification, compliance and consultancy services to marine and offshore industries…”317 The Lloyd’s Register Foundation is the owner of this service provider, which is described as a technical and business services organisation and a maritime classification society.

Dissemination
During the progress and writing process of the project some blog post and tweeter posts are intended to be published to raise awareness for the topic and to get some help if necessary. If

316 Ibid., p. 306.
successfully completed and accepted the end result will be published in CityLIS section at the Humanities Common repository.

Work plan
Initially the plan for the writing process would be to examine the relevant literature on the topic and connect via e-mail with the relevant archives and organisations that hold the Lloyd’s Register of Shipping records and archival material that would be helpful for the progress of the dissertation. After the collection of material process is over writing of drafts will commence.

Methodology
The methodology which will be employed to complete this project would be mainly desk research, involving literature review and archival material examination. The research will proceed in such an order that first we will examine the history of the register so as to understand better the context in which it was created and more importantly why it was created. The main research would be quantitative data analysis, as the project is concerned with a shipbuilding database, which consist of inferential statistics on shipbuilding output. Then we will move to describing and examining the record management systems employed by the register, so as to reach the period of our interest, the twentieth century. Further, we will take a look at the philosophy behind the data that was and is collected in the register and why this data was collected. Also, we will try to find how this data collected by the Lloyd’s Register of Shipping was benefiting the shipping and shipbuilding industry of the United Kingdom.

Furthermore, in order to fully understand the subject of shipping and shipbuilding databases, we will take a look at few other examples of databases such as, Shipbuilding Conference and the British Shipbuilding Database (BSD), besides Lloyd’s Register of Shipping. We will choose the British Shipbuilding Database, because it was the first to utilise GSN system, according to Global Ship Number System website. “BSD was started by the late John Raper from a card index of over 100000 ships. Together with Ian Buxton of Newcastle University and some initial funding from the Economic & Social Research Council, a comprehensive database system has been developed using Superbase software. It currently records data on some 80000 ships built or engined ships in the British Isles from the mid-19th century to the present. The underlying database includes more information such as construction dates, dimensions and machinery details, where available.”

As this shows the BSD was fairly new creation, which straddled both the analogue and digital ages, being created in card index form and being transferred to digital born software. The database is not as comprehensive as the Lloyd’s register which encompasses data since the mid-eighteenth century, nevertheless, the BSD would still be useful as the period we will be looking at will be the twentieth century, included in the both databases.

Literature review
One of the methods, as mentioned above, will be desk research, which will involve literature review, both on the relevant archival and secondary material. However, the literature review would be mostly selective, as it would be impossible to cover all the existing archival and secondary sources that exist in the volume of this project. While examining the available relevant material a critical literature review will also be made, to say if the material is accurate and its usefulness to the subject. Other methods, such historical and content analysis will also be employed.

Starting point of the research is a publication by Ian Buxton, Roy Fenton and Hugh Murphy from The Mariner’s Mirror called Measuring Britain’s Merchant Shipbuilding Output in the Twentieth

318 Global Ship Number System; http://gsn.ncl.ac.uk/?p=bsd_about accessed 18:33 on 03/05/2019.
Century from 2015. It is a relatively contemporary research undertaken less than four years ago. A particular attention would be paid to references and bibliography section of this research as some of the sources might be relevant to this project. Furthermore, the authors are well established researchers in the sphere of marine and naval sciences. The project will also utilise reports such as this one from 1976 stating that Lloyd’s Register of Shipping has adopted A1 which means NDT (Non-Destructive Testing). The report states that NDT and computer aids replaced direct surveys for making hull material in accordance with shipbuilding standards. Lloyd’s gave out quality assurance certificates. This will expand the topic and show that registration society such as Lloyd’s are not just databases of shipbuilding, but organisation with much bigger outreach. However, the main aim for this project would be emphasis on the database of the Lloyd’s Register as this is main consideration for the Library and Information Science field. Another, good source of information would be the Economist, as it covers Lloyd’s Register as well. On July 23rd, 1921 the Economist wrote that the new edition of the register at that period included upwards of 33,000 steamers and sailing ships. Furthermore, an interesting fact noted by the Economist was the reduction in sailing tonnage since pre-World War One period, from June 1914 was 852,000 tons, and this was a much smaller decline than any of the previous seven years.

Joseph F. Clarke would be important author, which this project will use for the Tyne and Wear shipyards, especially his two volumes: ‘Building Ships on the North East Coast /Part 1. c.1640-1914/’ and ‘Building Ships on the North East Coast /Part 2. c.1914-c.1980/ A Labour of Love, Risk and Pain’. Another publication from J. F. Clarke which would also be useful would be ‘A Century of Service to Engineering and Shipbuilding, A Centenary History of North East Coast Institute of Engineers and Shipbuilders 1884-1984’. These books will give us a more story to the statistics of the Lloyd’s Register of Shipping database for the North East of England shipbuilders. Another good source of information regarding the shipbuilding which would provide background to the statistics provided by the Lloyd’s will be Edward H. Lorenz’s book Economic Decline in Britain, The Shipbuilding Industry, 1890-1970. "The British shipbuilding industry was divided between two main districts and four rivers: the Clyde river in Scotland, and the Tyne, Tees and Wear rivers in the north-east coast of England… A certain amount of specialisation took place on a regional basis… The Clyde, though known for its large passenger liners and warships, was the most diversified of the rivers, producing a range of vessel-types, including fishing, coastal, harbour and cargo ships.”

The book’s focus is on economics, however, the connection between the data stored inside Lloyds Register of Shipping is very important, for instance the data is likely to show and confirm the above statement by Lorenz.

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Reflection

In light of all the work done to complete this project, we can claim that all the tasks set out in the proposal were completed in a satisfactory fashion. The ideas put forward in the proposal were researched to the best possible extent, by visiting Newcastle’s Discovery Museum, with its extensive shipbuilding archive and by visiting the British Library reading rooms and researching the materials which were related to the topic on hand and which they had on hold. The most useful materials found in the Discovery Museum’s archive were the Red Book, or the Shipowners Register of 1804. This register contained review of the events that lead to the creation of this rival register to the Green Book, or also known as the Underwriters register in 1799. In respect of the secondary sources, the archive had an extensive collection of materials related to the shipbuilding industry of the North East England, especially the region of Tyne & Wear. The British Library contained also an extensive collection of books related to the shipbuilding industry, and most importantly it had books on every shipbuilding region, not just concentrated on region as the archive in Newcastle. But, most crucially, it had a good collection of Annual Reports produced by the Lloyd’s Register of Shipping, however many of the years were missing. For example, for this project, the author, was able to find the copies from 1907 to 1955 and in this range some of the years were missing, whether they were not published or either missing. Examples of periods were no reports were published are present in the main body of this research. Another good source of information on the activities of the Lloyd’s Register were the Annals of Lloyd’s Register, published in 1834 (for the fiftieth anniversary of the Lloyd’s Register, after its consolidation in 1834) and the centenary edition from 1934. Similar source was the 2010 edition written by Nigel Watson; Lloyd’s Register, 250 years of service.

During the planning stage of this project it was decided to split it roughly in two parts. One part was to be prelude to the creation of the register, which would include a short description of what were developments which led to 1760 and the establishment of the register, around Lloyd’s coffee shop, where the London underwriters usually frequented. The next section of this part would be the early years of the register, where an account of the rivalry between the Red and Green Book would be given and how this almost led to the demise of the both registers, and how they finally merged in 1834 to one register, which we know today as Lloyd’s. Then we would look at the developments of the shipbuilding industry, the monumental changes in the materials used in ship construction: wood-iron-steel, with a section devoted to the other important change that made shipping a global enterprise, that of the ship propulsion changes, which lead from the sail to the steam turbine and the internal combustion engine adoption in the latter part of the 1800s and the early 1900s. This would have been examined in connection of how it all affected the Lloyd’s Register and what measures the register took to stay ahead. The second part of the project would be history of the twentieth century developments, with view of each section examining one decade. This allowed the detailed examination of the developments that were happening inside these ten-year periods and how it affected the Lloyd’s Register of Shipping.

The final results of this project coincide relatively well with what was set out in the proposal that was submitted for this project, although in the first part which was mainly aimed at the early history of the shipbuilding industry there was no easy way of examining the tonnage statistics as there were no Annual Reports for these periods, however the second part which was concerned with the twentieth century looked at the recorded tonnages that were present in the Annual Reports which were examined in the British Library. The project also looked at the indexing system which was used by the society during the 1960, and which was included in an Appendix at the end of the project. Although there was limited space for a proper examination of the system in the main body of the text.

At the completion of the research, the author, feels that he has gained a good inside understanding of the history of the Lloyd’s Register of Shipping and how this register influenced and continues to influence the shipping business and shipbuilding industry of the UK and around the globe. The main thing that was understood from doing this research was what important role industrial databases played in historical research of industries and questions related to industrial production.
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