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The shipbuilding industry in Norway and the rise of the Aker Group

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Abstract

This article aims to discuss what factors have determined the development of the Norwegian shipbuilding and ship repair industry after 1945, and how its place in the industrial structure has changed in the after-war epoch. In addition to market conditions and political regulations, a structural change in the way capital operates in the industry is important. We will also discuss the system of industrial relations developed in this branch.

Keywords

Norway; shipbuilding; state intervention; labour relations

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La industria naval noruega y el ascenso del Grupo Aker

Resumen

Este artículo tiene como objetivo analizar los factores que determinaron el desarrollo de la industria naval noruega, y cómo ha cambiado su lugar en la estructura industrial desde la segunda posguerra. Consideramos, además de las condiciones del mercado y las regulaciones políticas, la importancia del cambio estructural en la forma en que opera el capital en la industria. También debatimos el sistema de relaciones laborales desarrollado en esta rama.

Palabras clave:

Noruega; construcción naval; intervención estatal; relaciones laborales

1. Introduction

Norway is a small country, with a population in 2019 of about 5,3 million. Around 1950, it was less than 3,3 million. Despite this, Norwegian shipbuilding firms have in periods played an important part in the world's shipbuilding industry. Since the 19th Century, the country has had one of the world's largest merchant fleets, and shipyards emerged to cater for a large home market for ship repair and building of new ships, copying technology and taking over market shares from British shipbuilders.

In 1950, the shipbuilding industry employed around 18,000 people, seven percent of the industrial labour force. In 2017, about 18,000 also worked in the building of ships and oil platforms (8 % of the work force in industry), according to official statistics.³ If we look at the production value, it amounted to 5 % of the total for industry in 1950 and 7

³ See appendix, table 1 and table 4. It must be noted that these figures are merely rough indicators, and that they are not directly comparable over time, since the basis for categorizing has changed several times. Because of such changes, the number of employed in 2017 is underestimated, so that in fact the number would be higher if counted on the same grounds as in 1950.

% in 2017.⁴ The fortunes of the sector have oscillated, and there have been major internal changes during this period. But the sector as a whole has survived the crises and market problems without losing its position in the economic structure.

This article aims to discuss what factors have determined the development of the Norwegian shipbuilding and ship repair industry after 1945, and how its place in the industrial structure has changed during the post-war years. In addition to market conditions and the labour productivity of the yards, political regulations have been important, and we consider how state intervention has influenced its survival. We also discuss the role of labour relations. The concept of “the Nordic model of labour relations” has played an important role in public debate on the competitive power of industry, implying that it denotes a specific variant of capitalism, characterized by relations of trust and cooperation between managers and workers and their organisations.⁵ We discuss the role of this system of labour relations in the success of shipbuilding and how these relations have changed.

The framework for our analysis is a periodization in three distinct periods. Like in the rest of the world, there was a decisive turning point in the fortunes of shipbuilding in the mid-1970s caused by the shipping crisis. In the Norwegian case, one could say that a continuous production cycle started after the war and ended around 1975. During this period, production volume and employment increased. In the next phase the sector underwent a major restructuring as firms were adapting to new market conditions, while other production sites were shut down. Oil extraction activities in the North Sea were instrumental in the consolidation of new markets, and here state regulation of market access played a major role in protecting the interests of domestic firms. In the third phase, from around 1990, Norwegian yards were again exposed to intensified international competition. In this period, a process of rapid capital concentration changed the power relations in the industry.

Of course, changes in the capital structure and the way capital operates in the industry also took place in the earlier periods. Initially,

⁴ *Statistical yearbook* 1952 and *Strukturstatistikk for industri og bergverksdrift* 2017, Statistics Norway: <https://www.ssb.no/statbank/table/08597/tableView-Layout1/>

⁵ Heiret (2012).

shipbuilding and ship repair in Norway were generally conducted by production sites run by independent firms. But by the 1950s an industrial group was formed, as the Oslo firm Akers Mekaniske Verksted acquired other yards as subsidiaries geared to the mother firm's production program. Over the years this group grew and became dominant in the sector. The analysis of this process will therefore successively follow two paths: the development of the branch as a (statistical) whole; and the development of a core element, the industrial groups, and in particular, the Aker Group, which was the most important.

The source material we use are of two types. First, statistical sources on the development of shipbuilding take the official figures from Statistics Norway as a starting point and are supplemented by surveys undertaken by public commissions. Further, materials from the Branch Council for the Shipbuilding Industry is used to cover the assessments and political initiatives of political and industry leaders. Secondly, the analysis of the Aker Group and its Stord yard builds on extensive personal and colleagues' work, and especially on our participation in a recent project to write the history of the yard that drew on an extensive use of interviews with the yard's workers' representatives, managers and engineers.⁶ This material is basic to our understanding of developments during the last decades.

We first outline the significance of shipbuilding in the industrial structure in the first phase, pointing out its economic and organisational role in industrial life. Thereafter, we briefly discuss the branch's relations to the state: What interest did the government have in this sector, and what impact did the sector have in the political system? The rest of the article discusses the fate of the branch in the three periods: The expansion phase 1945-1975, the restructuration phase between 1975 and the 1990s, and finally the adaptation to more globalised competition from the 1990s.

2. Shipbuilding's place in the industrial structure

Industry was the dynamic force that led economic growth in Norway after 1945. The industrial sector as a whole accounted for nearly one third of the country's work force between 1945 and the 1970s. The industrial structure comprised different branches based on production of

⁶ See the source overview for more detail.

raw materials and semi-manufactured products, like iron and copper ore, chemicals and metals, pulp and paper. The consumer goods industries were also important, even if production of textiles, clothes and shoes was diminishing with the development of free trade agreements in the 1960s. Especially central to the industrial structure was the engineering industry, producing machinery, steel structures, and other mechanical equipment, including steel ships. In the years around 1950, about 30 % of the industrial labour force belonged to this branch. About 7 % of all workers were employed in building and repair of steel ships. In addition to those directly employed in shipbuilding, maybe as many as fifty percent more working in other branches were producing equipment for the yards in 1972.⁷ And in the following years, until its culmination in the 1970s, shipbuilding's share of the work force was increasing (Table 1).

Compared to other shipbuilding nations, the branch in Norway has been characterized by a very low degree of concentration, with a large number of firms, most of them small and located all around the long coast. Official statistics reflect this structure: in 1972 there were 194 registered firms in 1972 employing 30,352 workers, with an average of 63, 6 workers per firm. These figures hide the diversification of the sector. The largest 16 yards (with over 500 employees) employed 63 percent of the total workforce. 61 yards that employed over 50 workers accounted for 87 percent of the total work force. This means that the remaining 133 units were very small, with 28 employees on average. Thirty years earlier, the situation was not very different: 71 percent of the work force worked in the 18 largest yards, which each employed almost 500 workers, while the rest of the yards employed on average 34 each.⁸ The historical background for the many small-scale firms may be found in the class structure of rural Norway, where many people lived off fishing from their own boats, representing a market for local firms in building and repairing the small vessels and their motors. In the 1950s, many of these firms started to build boats in steel instead of wood and were able to build vessels for local passenger routes and other means of coastal sea transport. Later on some of them also took a further step into the medium-sized category.

⁷ NOU (1974, 361) gives an estimate of 10-15000 persons working in other sectors.

⁸ Aamundsen (1941, 18f.), see table 2.

The large and medium-sized yards originated from another social context. They were usually situated in the larger coastal towns. These firms were established for building and repairing the ships of the urban shipping firms managing the merchant fleet sailing in international waters. It is these yards that interest us here. They have been central to the technical and economic development of the industry, and also the most influential in politics. The major shipyards were concentrated in the capital and the Oslofjord district. A 1941 survey of the 18 Norwegian yards building ships on a regular basis shows that 10 yards were situated in coastal towns in this heavily industrialized area. The Oslofjord district represented a concentration of large workplaces for metal workers and also for engineers, with a common labour market and strong organizations catering for their social interests. The situation was not very different at the end of the growth period. In 1972, of the 16 yards with more than 500 workers each, 11 were situated in the same area, and were mostly the same ones as thirty years before.⁹ In addition, there were also some important yards with a relatively large work force on the west coast which played important roles during the growth period, and which from the 1970s became central in the transition to the production of offshore installations. It must be added that ownership was now more concentrated than these figures show, because of the formation of industrial groups (see below).

Since the 19th century, therefore, the basis for the large yards has been the merchant fleet, which has been important in Norway's economic structure and one of the largest in the world. Its share of the world fleet's tonnage was 6,9 % in 1939, and 8,2 % in 1973.¹⁰ This fleet contributed significantly to the gross national product, a circumstance of special importance because it yielded vital foreign currency income for economic development during the early postwar years with restrictions on international payments. The shipping industry was therefore politically influential. Shipping firms had strong relations to many shipbuilding firms. They were majority owners in many of them, and in so far as they placed orders for ships in Norway, had close contacts with yards on technical questions of ship design.

All in all, shipbuilding was central to the economy for various reasons. First, the value of production and of the deliveries of material

⁹ Aamundsen (1941, 18f); NOU (1973, 13).

¹⁰ NOU (1974, 16).

and equipment from other firms were considerable. The engineering industry as a whole played a leading role in industrial development, by driving technological innovation and fabricating production equipment, but the shipbuilding firms in particular were regarded as “growth centres for competence”.¹¹ Secondly, the branch represented employment for many people and was basic to the life of many local communities. It also represented an influential part of the organized interests in industry, its professional organizations being dominant in formulating employers’ strategies towards the state. The organized interests of shipbuilding firms, which were also in many questions in close cooperation with the ship owners, therefore weighed heavily in economic policy affairs. The same was the case for workers: metalworkers showed a high ratio of union membership, were central in formulating and fighting for the organized interests of the central trade union organization, and their most important strongholds were the large yards.

3. The role of the state

State intervention in the shipbuilding industry has played an important role in its whole post-war development. The organized interests of the industry had their impact on the political regulations of the shipbuilding market in several ways. The unemployment crisis in the interwar years prompted unions’ claims for political remedies. The conditions of the shipbuilding industry engaged political authorities, especially after the social democratic party (DNA, literally the ‘Norwegian Workers’ Party’) took over government in 1935, with a programme geared to use public resources to promote industrialization. One of the proposed projects engaging both industry’s leaders, metal workers’ organisations and the government, was a scheme to modernize and greatly expand production capacity in shipbuilding. In the following years, a programme to secure state support for investment in shipyards was negotiated. In the early post-war years, parliament granted state funding for investment in production facilities to some of the bigger yards. This was just a small part of the investments made in the period, but it signalled the state’s interest in the sector branch as an important one for the national economy.

¹¹ NOU (1974, 362).

The situation after the war posed special problems for a government that had as its primary task to rebuild the economy after five years of German occupation. Necessary materials were scarce, and foreign currency remittances were restricted in order to give priority to some imported goods. The opportunity to order ships abroad was strictly regulated. As most shipping countries needed to rebuild their own commercial fleets, their yards were busy with domestic orders. Therefore, if Norwegians shipping firms could not raise capital and get contracts with yards abroad, they had to order new ships at home. Furthermore, during the 1948-1951 years the government prohibited contracting ships outside Norway. The situation opened market opportunities which resulted in investments in Norwegian shipyards. During the 1960s, international trade was gradually liberalized, and the protection of shipbuilding was reduced. But active government participation in the affairs of the industry continued by means of the “Branch Council for the Shipbuilding Industry”, established in 1947¹². Originally, the branch councils were conceived (at least by the unions) as vehicles for socialization of industry. Yard managers, therefore, were reluctant to participate in them. But councils soon became an organ for cooperation between state, management and unions, and coordinated their vested interests in order to influence political decisions in favour of the industry. They discussed the market situation and made initiatives to further the industry’s competitive power. An important issue during the 1960s was the question of subsidies. With the cheap credit lines Japanese yards offered to ship owners in mind, the council recommended government subsidies to allow Norwegian yards to obtain loans on similar conditions. The government was attentive to such suggestions. In 1959 an institution with state participation for giving credit to the building of ships at Norwegian yards was established. Later, the state increased its support several times. When the crisis struck in the 1970s, the government intervened more directly. First it prohibited extensions of the building capacity of the yards, and then planned reductions and switching production to new markets. Substantial public funds to support many companies secured their survival, in several cases made the transition to offshore production possible.

¹² Excerpts from the annual reports of the Council of the shipbuilding industry are printed in *Norsk Jern- og Metallarbeiderforbund. Beretning on forbundets virksomhet* each year from 1947 to 1980.

Of decisive importance for the fate of the yards after the oil crisis is also the so-called “Norwegianization policy” in relation to the opening of oil extraction in the North Sea. After oil was discovered at the end of the 1960s, the oil companies had to accept the condition to transfer competence in offshore operations to Norwegian firms. The state also established its own company, Statoil, in order to gradually take over operations of oil fields. Thus, it became possible for shipbuilding firms and the engineering industry more generally to develop advanced products for the oil industry and secure a strong position in the market. State support to enter this new market was probably a necessary condition for the industry to be able to make the transition.

4. The cycle of expansion 1945–1975

When the war ended, Norwegian shipbuilding could look back on 25 years with a very bleak production record. None of the yards had been able to build ships to their full capacity. They had become less and less competitive, despite the fact that the country’s large fleet had expanded greatly in the same period. The yards might have a large home market; many of them were partly owned by or had otherwise close connections to shipping firms. Still, most new ships were built abroad. One reason for this is that shipping firms now preferred other ship types than before. The Norwegian commercial fleet of 1920 had consisted foremost of small steamships (70 % less than 4000 tdw), used in the trades between European harbours. In the interwar years, Norwegian firms were pressed out of these trades, and instead invested in ships geared to expand the business of oil transportation. This meant transport between continents, where large tankers with diesel engines were the most cost effective.¹³ The expansion in tankers changed the composition of the fleet. In 1950 43,8 % of total tonnage were tankers, 62 % were over 6000 grt and 76 % were motor ships.¹⁴ This was a class of ships that most Norwegian yards had not been technically capable of building. Only one yard, the Akers Mekaniske Verksted in Oslo, had a licence to build ship diesel engines. Also

¹³ Aamundsen (1941, 12); Kuuse (1983, 75f).

¹⁴ Historisk statistikk (1994) tab. 20.7: Number and tonnage of vessels and tab. 20.10: The merchant fleet by the size of ships. https://www.ssb.no/a/histstat/nos/nos_c188.pdf.

yard firms were unable to attract the necessary capital to modernize their production facilities.

The fact that most of the ships ordered by Norwegian shipowners were built abroad contributed to the formation of a world market for new ships. Together with other countries with a large fleet and virtually no shipbuilding industry, like Greece, Norwegian demand represented an international market open for global competition.¹⁵ Other European yards delivered most of the new Norwegian ships in the immediate post-war years, above all Sweden. But soon Japan entered the market and took a large share. The first orders from Norway, two whaling vessels, were placed in 1948.¹⁶ Eventually, Japan's growing competitiveness made the country the largest supplier, especially of tankers.

In this global market, the question was whether yards would be able to build larger ships. Technological developments favoured ships with high loading capacity which were cheaper to manage (e.g., by smaller crew, better fuel economy and shorter time in port for loading and unloading). As a result, new ships were more cost effective than slightly older ships, and this drove the renewal of fleets. Japanese yards were pioneers in new ships' design.¹⁷ These trends meant that, in order to be awarded contracts, yards had more or less permanently to invest in expanded production facilities.

Other areas where the Japanese were competitive, were short delivery times and low prices. Both demanded a continuous rationalization in the organisation of work, especially in production. Short delivery periods also put a premium on the size of the yard: with many workers employed, the task would of course be finished in less time. Therefore, countries with a high degree of capital concentration in the sector, like Japan and Sweden, had an advantage over the Norwegian yard industry.¹⁸ The cost of a ship, on the other hand, depended on how much work was necessary to build it. Yards measured their effectiveness by the amount of steel processed per work hour. Cost effectiveness was in practice handled by schemes to reduce the amount of work laid down in the product.

¹⁵ Olsson (1983, 125ff., 189).

¹⁶ Chida & Davis (1990, 83).

¹⁷ Chida & Davis (1990, 117).

¹⁸ In Sweden, six yards represented 85-90 % of the purchased materials (and thereby of production); Kuuse (1983, 7).

During the 1940s, a general conviction emerged among Norwegian yard leaders that it would be possible to regain a share in the shipbuilding market. Given the extraordinary demand for tonnage because of war losses, and the restrictions on international payments, they anticipated favourable conditions for domestic production. All large or middle-sized firms made plans to catch up with their foreign competitors. The first decade after 1945 was used to rebuild berths and workshops on an extended scale in order to build large ships. But they had to be able to build ships at competitive prices. Here, it was obvious to yard leaders that the production system used in war production in the USA must lay at the basis for their plans for the future. It included block building of the hulls and welding together of the parts, an innovation that was also implemented in other shipbuilding countries. Block building would make production more flexible, facilitating prefabrication of parts and the assembly of sections of the hulls in assembly halls. This way, several sections could be built in parallel before they were mounted on the berth. In the existing practice, each steel profile and plate were assembled on the berth after the previous one had been put in place.¹⁹ The new methods promised to reduce the work hours necessary to build a hull, and to make the building process more effective, a potential that was gradually exploited during the following decades.

The implementation of the new production system was a major transformation that took several years and demanded heavy investments. Larger building berths were re-arranged to build large hulls, but market conditions made it hard for the firms to realize their extended capacity potential. For example, since 1920 Rosenberg Mekaniske Verksted, one of the big yards on the west coast, had been technically able to build ships up to 20 000 tdw. But virtually no new ships had been built before the war, and the vessels actually built in the late 1940s were much smaller. The yard invested in new facilities every year since 1945, but it was not until 1950 that it was able to build the first large ship (though because of low productivity the economic result of this project was meagre).²⁰ Thereafter, until the late 1960s, when Aker took the lead, the yard consistently delivered the largest ships built in Norway. Some of the remaining yards were

¹⁹ For a thorough analysis, see Andersen (1986).

²⁰ Nerheim & al. (1995, 202f).

slower to implement the change.²¹ But by the mid-1950s most yards had completed the transition.

During the 1950s, then, the Norwegian yards were transformed on the basis of the new production system, block building and welding. At the end of the decade, the total building capacity had risen to 300 000 – 350 000 grt per year, twice as much as before the war. What was actually built was less, but finished tonnage quadrupled between 1951 and 1961.²² A symptom of the growing competitive strength of the domestic industry was that during since 1950 total tonnage delivered to Norwegian shipping firms grew from 9 to 30 % of total deliveries. Whereas in 1961 actual size of ordered ships ranged from of 60000 to -75000 grt, ten years before the largest ship that Norwegian yards were able to build was 12000 grt.²³ A precondition for this success was renewed investments in facilities in order to build the larger ships that were in high demand. In the years round 1960, several large yards constructed building docks, a major innovation compared to the traditional berths. Efforts to work more efficiently became a permanent part of the work organisation. The first phase of rationalizations, introducing block building and welding, was followed by “sustained efforts” to “modernize and rationalize” production. Investments in lifting equipment with higher capacity made it possible to pre-fabricate ever larger blocks. More efficient equipment for marking and cutting was introduced. First and foremost, changes in the organization of work were implemented; as from the early 1960s, the importance of planning was especially stressed. The firms benefited from innovations in other countries, through delegations visiting foreign yards, and through the work of research institutions. The Council of the shipbuilding industry argued that intensified research in Norwegian institutions was important in order to “achieve optimal benefits from international research results”.²⁴

²¹ Magdal (1993, 283).

²² Excerpts from the annual report of the Council of the shipbuilding industry, in *Norsk Jern- og Metallarbeiderforbund. Beretning om forbundets virksomhet* (1959, 87). For pre-war capacity: Aamundsen (1941, 19). In 1959 244500 grt were delivered from Norwegian yards. Excerpts... (1959).

²³ Excerpts from the annual report of the Council of the shipbuilding industry, in *Norsk Jern- og Metallarbeiderforbund. Beretning om forbundets virksomhet* (1961, 244).

²⁴ Excerpts (1969, 113).

In the period 1960-1975, the capacity of the major yards was further augmented by investments in docks and workshops. Employment grew, too, but at a modest pace. Measured by the amount of steel processed per worker, productivity was increasing rapidly (admittedly, partly an effect of the increasing ship sizes). But despite all the investments and the increased production, profitability was not the best. The yards complained year after year that they had to sign contracts at a loss. The Council of the industry identified the cause in global overproduction, which depressed prices. First towards the end of the 1960s this situation changed. In 1969 the branch was booming. Now the yards could at last produce at full capacity.

The development of the Norwegian yards since the war, their modernization and constant rationalization of production and their ability to build more and more advanced products, had made them more similar to the industry in other countries. Several Norwegian yards increased the size of the ships they built at more or less the same pace in this period, competing in building ever larger tankers. They were part of a global production system characterized by a logic of development common to the competing yards. An important difference, however, was the size of workplaces. The large Norwegian yards were small in international comparison. The decentralized structure of the industry gave Norwegian firms a disadvantage compared to the big Swedish and Japanese, with their large capital bases and high production volumes.

Then in the 1950s, a concentration process started in Norwegian shipbuilding. Akers Mekaniske Verksted (AMV), adopted a strategy to spread production on different units by combining several yards in the production process. This firm had the advantage of being the only one in the country licenced to build ship diesel engines when the war ended.²⁵ It also had one of the biggest shipping firms as its owner. The yard was situated in the capital, without enough space to build large ships. Aker's strategy to solve this problem was to acquire other yards outside the city in order to build the large hulls, which would then be moved to the capital to be outfitted. In 1956, the Oslo firm bought a small yard on the western coast, establishing Stord Verft, where heavy investments were made. A building dock with capacity to build hulls of 65000 tdw. was finished in 1958, and after a few years extended to 100000 tons.²⁶

²⁵ Two other yards soon acquired such licences, but the rest continued to rely on outside suppliers of diesel engines.

²⁶ Grove & Heiret (1996, 100).

By acquiring majority shares in other yards, AMV established the first real multi-unit group in Norwegian shipbuilding. The number of subordinated units grew; ten years after the first acquisition another large firm was bought, Bergens Mekaniske Verksteder. Now AMV controlled five units, and had the option to integrate their building programmes in its overall strategy. In particular, several units around the coast built sections of hulls that were then towed to Stord to be assembled, and thereafter the hull was towed to Oslo to be equipped. This strategy enabled AMV to build supertankers of ever larger size, the only firm to enter the most keen struggle to secure orders for the largest tankers. While the largest ship built in Stord until 1959 was 6000 grt, in the 1960s the tonnage grew from 20000 grt to 110000, and in 1975 to 140000.²⁷ In the early 1970s it was by far the most important shipbuilder in the country, representing 28 % of employment in the larger firms in the industry. By that time the concentration of ownership had resulted in the formation of five other groups controlling several production units. The six groups together controlled 44 % of employment in the large firms.²⁸

5. Production system and industrial relations

The imperatives of competition in the international market resulted in the investments in production facilities and rationalization of the yard organizations during the expansion phase. But it remained to realize the potential for productivity gains that lay in the production system and in the ability to build the types of ships with the fastest increase in demand. The actual performance of production depended on the people doing the work. The specific form of relations in the workplace, between managers, foremen and workers, must therefore be considered as a factor in defining the efficiency of the production process.

Shipbuilding based on block building poses demands on the organisation of the production process; coordination of tasks, workers and material in order to secure a cost effective process. As the production system has potential for ever more cost-cutting, it tends to become more complicated over time. During the growth phase, the role of the engi-

²⁷ Myklebust (1994, 207f). Figures in dwt converted to grt: <https://www.sjohistorie.no/no/skip>.

²⁸ NOU (1973, 19).

neers became more important. Both the technical work, the theoretical construction of the ships, and the planning of production became more complex. The ratio of engineers to workers thereby increased.²⁹ This ratio expresses a changing balance between the two groups in the production process: More and more decisions were taken as part of the design of the ships. From early in the 1950s, optical marking was introduced, i.e., the form of the steel plates was transferred directly from the drawings to the plates. The next step was to let burning machines automatically cut the steel guided by the optically transferred drawings, and eventually numerical drawing and burning machines were developed which could transfer the design of the parts on the basis of information fed from the designers' calculations.

A core competence of the skilled plate workers was thereby transferred to the engineering departments. Simultaneously, planning and controlling the building process tended to become more central to economizing production, another factor strengthening the role of the engineers. As already mentioned, the key factor in monitoring cost effectiveness was the throughput of steel per work hour, and workers being idle because they lacked the means to do their task meant increased costs. The rationalization of the work process seemingly did not generate conflict with those working in production. The skilled production workers were in favour of measures that made the process more cost effective. To understand why, we need to consider the relations that characterized the work ethos in this industry.

A basic condition for profitable production, as well as for the living standards of workers, is the way the firms' relations to their work force is regulated. The system of labour relations which had developed during the first decades of the 20th Century was founded on the principle of negotiations between nation-wide labour market organisations and on the active participation by the state in regulating the negotiating procedures. Agreements covering the whole country were signed for periods of two or three years during which strikes were prohibited. In case negotiations ended in conflict, the government could intervene by dictating a new agreement. During the first period after the war, on several occasions the general wage tariffs were fixed by the state in this way. The government wanted to limit growth in wage levels in order to prioritize investments. In this way, industrial peace

²⁹ For the following, see Ågotnes & Heiret (2017).

was generally secured. Metalworkers had, from the beginning of the 20th Century, been able to formalize certain principles that ruled their relations both at industry level and with management in the workplace. A formalized agreement at national level whereby the minimum wage level was central secured these principles. They had been fighting hard to get these principles codified and to defend them during the inter-war years. An effect of the process was a strong union organisation with members highly conscious of their common interests, a trait that characterized the organisation into the postwar period, especially in larger workplaces with pre-war traditions.

In everyday experience, industrial relations are above all enacted at workplace level. In the engineering industry, wages were dependent on piece rates negotiated between foremen and work teams in the individual workplaces. Metal workers' real wages were therefore a question of what they could earn from piece work. Workers expected to earn considerably more than their hourly wage when they did piece work – 50 % more was often presupposed as ordinary. Despite all day-to-day haggling with foremen over the setting of piece rates, this system (which of course was in general use in most shipbuilding countries), was also an expression of a social relation embedded in the practice of production. It expressed workers' expectations about the *just* payment for a given job, and a moral claim that the firm should accept rates conforming to these expectations.

As a result, they experienced the interest conflict with management on a day-to-day basis, especially in connection with firms' efforts to gain control over wage development through time measurement and work studies which were generally introduced in the yards after 1945. Together with the bargaining process at national level, the piece rate system gave concrete form to the Norwegian class relations in this branch of industry.

During the 1950s, the piece rate system was the most important mechanism by which metalworkers could gain increases in their real income. During this period the central bargaining fixing hourly wages was tightly controlled by the government, which prioritized investment, especially in industry, in order to increase national economic growth. Workers would expect that their earnings would reflect the economic results of their firm. They just found that the gains achieved through productivity increases should be shared between the firm and themselves. As long as this condition was fulfilled, they were in favour of the piece rate system, which they viewed as the mechanism that could give them their share of the values produced.

They also conceived the principle of open negotiations as a basic right: Piece rates should be freely negotiated. If the firm did not respect that, e.g. by setting the rates on the basis of time measurement of the work operations, it would mean conflict.³⁰ The expectations that they had a *legitimate right* to share the value added in production with the firm seems to be foundational in the working ethos of the metal workers of the period. The workers of the large yards, the strongholds of the metalworkers' union, played a central role in enforcing the ideal in real life.

The ideal was alive not least in the Aker Group, where relations between management and the production workers developed in a special way. In the 1950s, management in the Oslo Yard found that the piece rate system had become a hindrance for further productivity gains. If the overall coordination of production was becoming more important for productivity than the work pace of each worker or work team, another form of motivation would be appropriate. The local union leader was also interested in a change. He was a determined adherent of cooperation on productivity as a way to a better life for workers. In 1957 the parties in the yard agreed to introduce a fixed salary combined with an agreement that the workers should contribute to increase productivity, and that actual increases would result in wage increases through local negotiations.³¹ The system spread to the other units in the group, and later to the rest of the yards and other parts of the metal industry.

The new wage system introduced important changes in the relations in the workplace. It tended to shift workers' focus from their individual piece rated jobs to the smooth progress of the overall production. Organized workers elected special shop stewards responsible for productivity work, and a regular and intimate cooperation on cost reductions was established. Regardless of the concrete productivity results, it contributed to establish an atmosphere of mutual understanding with management which, at least in the case of the Stord unit, has continued since. Of course, a presupposition for this cooperation is that union members feel that they are handled justly when it comes to wage and other working conditions,

³⁰ Cf. Svensson (1983, 273f.) about similar relations in Sweden: Workers in the Gothenburg yards were in favour of piece rates and time measurement as method to fix piece rates, precisely because it made it possible to influence their own income.

³¹ Grove & Heiret (1995, 87).

and that negotiations are really open. Now higher productivity was supposed to result in wage increases for all workers through local bargaining once a year. In principle, the fixed wage system was just another mechanism to secure the tacit agreement that production gains ought to be split between all parties. Thus it secured the “wage drift” that earlier had been a result of working to piece rates. During the period up to the 1970s this vehicle for wage increase contributed to maintain the fundamental class compromise that, with few exceptions, secured industrial peace.

How successful?

Looking back, the effort of the industry during the growth phase was a success: the yards were able to expand their market share and greatly expand production. According to official statistics, in 1975 output in shipbuilding passed one million grt, and employment reached a maximum with over 31000 workers. This work force did not only build and repair ships. That year only about 60 % of capacity was used to build the usual ship types; it was assessed that 6500-7000 employed were occupied with deliveries for the oil sector (this figure includes building of supply ships).³² The impact on the branch of the oil extraction in the North Sea had already become visible.

Like in other countries, Norwegian yards suffered from depressed prices during most of the 1960s due to international overproduction internationally. But, like in most other countries, they benefited from state subsidized credit like yards. However, they probably never achieved the same cost efficiency rates of global market leaders in this industry.³³ In addition, the size of Norwegian yards meant that they did not have big financial muscles. Most of them could not have operated with the same profitability of large yards in Sweden or Japan, which were still the most important competitors up to the yard crisis.³⁴ Those yards have been described as “ship factories”, that is specialized enterprises that built similar ships

³² Norsk Jern- og metallarbeiderforbund (1975, 50).

³³ See Svensson (1983, 291), table 36, with figures for produced grt per employed in different countries – not an accurate measure, but it may be an indication. It shows Norway lagging behind Japan and especially Sweden.

³⁴ NOU (1974, 13).

in series.³⁵ Their profitability presupposed a high volume of production, high throughput speed and production at the yard's full capacity. Norwegian yards did not achieve this ideal. But they were more flexible, usually building ships of different types and sizes. This flexibility was probably part of the explanation for their survival. Meanwhile, Swedish yards did not recover after the shipping crisis. Maybe they were less productive, but they were not as dependent on one segment in the market.

It is reasonable to conclude that yards in general were to a certain degree able to compete during the growth period on the basis of productivity. They adopted globally-developed methods, and managed to cut work hours in order to stay in business. The positive attitude of the employees towards productivity work must have contributed significantly to this. Even so, they needed the active support of the state, through both protective measures in the initial phase and subsidized credit later.

6. Crisis and reorganization on the basis of new markets, 1975–1990s

The shipping crisis of the mid 1970s had deep effects on the shipbuilding industry globally. The OECD considered a 40 % reduction in the world's shipbuilding capacity necessary, the Norwegian government accepted this recommendation, and foresaw a reduction of the shipbuilding work force of 6000 posts.³⁶ The Shipbuilding committee appointed by the Norwegian Ministry of Industry in 1976 proposed a plan to reach this goal, which implied a reduction in employment, but also aimed to help part of the industry to establish itself in new markets. The government was determined to take control over the adaptation process that it saw as necessary, rather than leave to the individual firms to tackle the effects. The yards could no longer obtain export orders because the European countries that until recently had placed orders in Norway now had established support schemes to protect their own yards.³⁷ The government met the situation by subsidising shipbuilding contracts of firms which under the new circumstances could not compete on price. Others got support for investments necessary to alter their production. In addition, government funding was used to help shipping firms through their liquidity crises. The

³⁵ Svensson (1983, 291ff).

³⁶ NOU (1978, 6f).

³⁷ NOU (1978, 6).

measures were seen as anti-cyclical, and therefore as aid for a limited period. The ministries intervened directly in the industry to reach its goals, to lead the firms through the crisis and avoid high unemployment rates.³⁸

The crisis hit the Aker Group particularly hard. When the boom ended in 1974, Aker received cancellations of supertankers totalling 2,3 million dwt for ships that should have been built at the Stord unit.³⁹ Aker, the company building the largest ships ever built in Norway, had followed a dangerous strategy in order to achieve its position. The supertankers built at Stord were ordered by shipping firms operating on the spot market for oil loads. This way, they earned very high profits on oil freights in boom periods. Ship-owners who made long-term freight contracts could build their supertankers at Japanese yards at lower prices than Aker was able to offer, at least partly due to Japanese cheap credit. But the Japanese demanded long-term freight contracts as security vis-a-vis the yard. Speculative shipping firms, therefore, could not get their tankers built in Japan. Aker, on the other hand, was not able to match Japanese terms and had to do business with the speculative firms at a high risk in order to get contracts. These shipping firms were the first to lose freight contracts when the market slumped, while those with long-term freight agreements were still in business.

What saved the Aker Group and the Stord yard in particular was orders for the oil industry. A group of engineers in Aker had started to develop designs for the oil industry. This work resulted in large production of a type of drilling rig that was a success in the market and was also licensed to yards in other countries. The group had recently established a yard specialized in building these rigs, Aker Verdal. When the crisis struck, Aker had also secured the order for the steel deck for a permanent installation in the sea. The establishment in this market made firm survival possible. The building of the platform deck was transferred to Stord. Aker abandoned ship-building and geared all efforts to products for the oil sector concentrated to the two yards, Stord and Verdal. The other firms were sold.

The rapid migration to new markets made it possible for Aker to survive, but it was still heavily dependent on state support. For years after the transformation, Aker was in financial trouble because of losses

³⁸ NOU (1978, 6).

³⁹ Mjelva (2005, 110).

originating in cancelled ship projects. In the case of the Aker Group, the state engaged in direct negotiations to keep the firm in business. The result was that the largest cement producer in Norway gained control over Aker, which thereby no longer was a dedicated yard firm, but became a conglomerate of branches (yards, building materials, construction). As a diversified industrial group, it was still one of the largest industrial firms in Norway.

The following period saw major changes in the structure of the industry. In 2000 the number of people employed in building ships was reduced to 25 % of those employed in 1975, according to official statistics. It was a historical coincidence that the offshore oil production was expanding during the crisis, but as a result Norwegian industry was better off than its counterparts in many other countries. The production of deliverances to the oil industry absorbed most of the work force. Protectionist measures helped to secure work for domestic firms. But only some of the yards benefited from the new market. Therefore, the crisis effected a major restructuring and relocalization of the branch. Almost all the major yards in the Oslofjord area were closed down during the 1980s. Here, only small firms remained in the old yard areas. Employment shifted to the west coast, where the large firms now produced oil platforms or modules for platforms, while a number of small yards were building special vessels for the oil industry. The western region had around 25000 workers employed in 1975, a figure that was unchanged in 2000, with a reduction to ca. 20000 in 2005. Almost all of them were engaged in building and repair of ships in 1975, but only 7500 in 2005.⁴⁰ The ships built in Norway once again consisted of small ships.⁴¹ Supply ships, for offshore activities, was one important type. This new market provided the basis for the expansion of the relatively small firms of the northwestern region. These technically advanced and expensive vessels represented high production values. They also demanded other professional skills, and offered opportunities to gain a higher profit than what was possible with ship types like the tankers, where the steel work was the main ingredient.

The growing importance of engineering, especially after the transition to production for the offshore sector, meant that large technical milieus were created. They were organized as daughter firms inside the Aker

⁴⁰ Bore & Skoglund (2008, 88).

⁴¹ NOU (1978, 14).

and Kvaerner Groups, and worked on ship and rig design and other tasks. Eventually, the different engineering milieus in Aker were merged to Aker Engineering, and from 1975 this major collection of professional skills was directed towards production for the oil sector.

Other firms tried to meet competition and changing structure of demand by specializing their production towards special tonnage. One class was chemical tankers, and another were tankers for transport of liquefied natural gas (LNG). A leading group in the engineering industry, Kvaerner, specialized in LNG tankers after it acquired a small yard where the engineers developed the technology, and thereafter bought the large Rosenberg yard in order to build larger LNG tankers.⁴² They had formed Moss Rosenberg Verft, a group inside Kvaerner, in 1969.⁴³ The group exploited the LNG technology and thereby secured its leading position in a niche in the shipbuilding market. It was later to become Aker's most important Norwegian competitor.

The former Aker units lived on for some years as parts of different constellations. Bergens Mekaniske Verksteder (BMV) is an interesting case. This firm, originally one of the more important and a small local group in itself before it became part of the Aker Group, was now acquired by a newly successful group consisting of small yards of the north west, the Ulstein Group. Ulstein had gained strength during the 60s and 70s by building small, but advanced vessels for the fishing fleet and after 1970 especially supply ships for the offshore business. The attraction of BMV was its successful production of diesel engines for auxiliary machinery. Ulstein soon sold out the shipbuilding department, keeping the motor and reparation departments. The shipbuilding department was taken over by local capital and later by the employees, and the new firm succeeded in getting shipbuilding orders for some time. It eventually delivered the largest ship ever built there before it was closed down in 1991.

The reparation department was also sold after some years, maybe as a result of diverging views on how the unit should be managed. Internal relations in many of the smaller yards in rural areas were different from the ones where the union traditions were more rooted. The way new managers conducted leadership met with distrust in the yard organization. It was sold to another, still smaller, local yard. Eventually, after 2000, it

⁴² Nerheim & al. (1995, 296ff).

⁴³ Nerheim & al. (1995, 300).

became the core of a new group, Bergen Group, which rapidly gained control of several yards both in Norway and abroad (including Rosenberg) and at most employed more than 2000 persons, before being reduced again to a small local player. In the meantime, the yard had built several small, advanced ships for seismic investigation of the sea bed.

The fate of BMV is indicative of a different reality facing the branch after the yard crisis. The end of stable ownership coincided with the end of relatively stable markets. There was also a general trend towards mergers in economic life starting in the 1980s. The build-up of the Aker Group in the 50s and 60s had been founded on a strictly industrial strategy, where firms were bought in order to increase production capacity geared to making a specific product. Now, firms were often bought in order to expand the scale of operations, without regard to their type of production. Production units were at times bought and sold again within a short period of time.

What were the consequences for the relations within the industry? With regard to the labour relations at national level, no substantial changes were made to the formal system. The central levels of the industrial relations system were maintained. As before, wage agreements for the whole metal industry were decided between the main organisations. At this level, the state might still influence the level of wages, but less directly than earlier. Government recommend moderate claims and sought to influence the negotiating parties by pointing to consequences for the economy of higher wage levels. Like in the past, it could also intervene more directly in the bargaining process.

A “test” of the union members’ attitudes to the industrial relations system was carried out around 1980. In an effort to limit wage increases, including the local wage drift, the government proclaimed a “wage stop” after the central bargaining process ended without agreement in 1978. The measure made wage increases illegal for the next one and a half years. This measure provoked a protest movement among the union members in the metal industry, led by the workers in the large yards. Workers considered that, on the one hand, there had been a breach of the principle of the right to free negotiations (“the bargaining right”); and that, on the other hand, the state prevented them from earning their fair share of produced value in the industry. The mobilisation had repercussion on the bargaining pro-

cesses in following years, during which yard workers took the leadership again. But after 1986 its energy faded out.⁴⁴

Despite the activism of the local unions, the conditions for the wage struggle had changed. Yards competing for orders of decks for the production platforms met hard competition. A big order like this could keep the work force occupied for several years. Aker Stord built the first deck for a major field in the North Sea delivered by a Norwegian firm, and took it for granted that they would also get the next. When they lost the order to its competitor, Rosenberg, it was experienced as a major setback that sparked a cost-cutting process in the aftermath. In spite of the vast investments in oil extraction, the yards building big offshore installations had to honour offers at the lowest possible price in order to be in business. The oil companies that were in charge of operating the fields, the state company Statoil included, had more or less monopoly power in relation to yard firms which competed fiercely among themselves. The unions had to consider the situation of the own firm before they claimed wage increases.

In the growth phase, the effort of the trade unions had centred around securing for their members a share of the increasing production in the form of growth in real wages, shorter work hours, extended vacations, and a better work environment. After the yard crisis, conditions for trade union activity changed. Local unions engaged more than before in their firm's struggle to secure orders and stay in business. They might have to renounce on wage claims in order to ascertain that the yard got orders. They also struggled to keep down the number of temporary workers, securing work for as many permanent employees as possible. The problem of recruitment of workers had been aggravated by the opening of oil extraction in the North Sea. Due to their high wage level, offshore activities attracted skilled metalworkers. Plate workers and welders in particular were in high demand.⁴⁵ Many of them were recruited from the yards. On the other hand, yards' manpower needs became more variable. In order to keep building schedules, it became necessary to hire temporary workers for shorter periods. Manpower firms emerged, and a part of the workforce became more mobile. The ratio of temporary to permanent workers in large yards reached 7,5 % in 1976.⁴⁶ It represented both a problem for the

⁴⁴ Ågotnes & Heiret (2017).

⁴⁵ Norsk Jern- og metallarbeiderforbund (1970, 200).

⁴⁶ NOU (1978, 17).

yards and its solution: The work force became less stable, but at the same time a market for temporary workers was created. Permanent workers resented the practice, both because the temporarily employed had higher wages, and because they were outsiders and therefore less efficient workers. After 2000 the recruitment of low-wage workers from the EU area was to pose a new problem for the local unions.

In this situation the horizon and field of action of workers' representatives widened, and industrial strategies became a central concern. It also meant that it became more important to be represented where important decisions were taken, that is in the board of the group, not only the local unit. The task of local union leaders became more complex. It was no longer only a question of defending the immediate working conditions of their members. They had to intervene in the management of the firm, design and apply strategies, enter into alliances with their leaders, and possibly with other players in the market. The content of the relations with management thereby changed. But the active support from the union representatives for the firms' interests continued. The relation of trust and cooperation was still an important asset in the competitive struggle.

7. Capital concentration and intensified global competition, 1990s-2019⁴⁷

The restructuring of the branch and its consolidation on the basis of new markets during the 1980s had resulted in an industry with a different composition. The building of new ships was drastically reduced. Now, production of big installations for the oil sector accounted for most of the activity. The market structure in this sector is different from what was the case for shipbuilding: There are few buyers, quite often only one whose monopolist position allows it to press down prices when there are several yard firms competing to "win" the order (that is the expression used).

From around 1990 the effect of these market conditions was reinforced by changes in the political regulations of the sector. State protectionist measures that secured Norwegian firms a large share of the orders during the 1980s were reversed. In 1993 a government initiative resulted in a project with the additional participation from the industry, and the oil companies in charge of oil fields which aimed at creating conditions

⁴⁷ For the following, see Byrkjeland & al. (2019).

for more cost-efficient production. Common standards and contract forms were among the means. The new attitude of government authorities, endorsed by the oil companies, was that the costs of installations in the North Sea should be harmonized with those of oil fields in other regions of the world. The basic premise was that costs must be reduced with 40 %.

The political background for the decision to globalize the cost level of Norwegian producers was, among other factors, an ambition to make it easier for Norwegian oil companies to internationalize. The state-owned Statoil aspired to do business in other parts of the world. In 2001 parliament agreed to partially privatise it and invited private capital to join in on the premise that Statoil would no longer be an instrument for political interests, but was to operate strictly on the basis of the logic of the market. According to the neo-liberal ideas that had gained force in political parties, including among the social democrats, the best way to regulate business was through the market. Hence, protectionism of the initial phase of oil extraction was given up. The ambition of earlier governments to actively support specific industries as part of an industrial political strategy had long been out of the question. As a seal of this political trend, in 1994 Norway joined the European Economic Area agreement with the European Union, which in practice made the country part of the common European market.

The marked shift in economic policy was not only an effect of a new ideology gaining foothold in politics. It was also a question of market strategies. In the early 1990s, it was a common opinion in the sector that the oil production in Norway had reached its peak, and that the oil companies had to find other areas in order to maintain their income. The oil price had also been low since the middle of the 1980s, making smaller reservoirs in the North Sea unprofitable to exploit. That implied fewer orders for the yards, and thereby harder competition between them

As a result of the intensified pressure to reduce their cost level, the yards producing for the offshore sector worked hard to reform their organizations and rationalize production processes. In Aker Stord, comprehensive rationalization projects were running during the rest of the decade. Special attention was paid to the coordination of the work of the engineers who delivered the design and specifications for the installations, and the people who actually constructed them. The ultimate purpose was to let both tasks influence each other – the needs of production should influence the way drawings were made. In this case the yard cooperated with another division of Aker, Aker Engineering, which had grown to a substantial size.

The focus on rationalization in the shipbuilding period had been foremost on the physical production process – on the logistics of building hull and machinery. In offshore production, where engineering work represented a larger part of work hours, more attention was paid to rationalize their work. During the 1980s and 1990s, digital programmes were perfected to automatize many engineering operations, resulting in substantial reductions in the time needed to produce work drawings. Other programmes were developed to monitor and coordinate the production process and to supervise and control the quality of work, e.g. welding seams. This way, much of the manual work of the engineers disappeared. On the other hand, the complexity of the products had greatly expanded. Engineers delivered much more detailed specifications, which lay at the basis of the production process, than had been the case for ships. The consequences were that a design that was difficult to build would have unforeseen costs. Therefore, cooperation in an early phase between those who did the basic form-giving and those who planned production was important to secure a cost-effective process. Product planning in such a way was easier and had a great potential for productivity gains. Simultaneously, the potential in block building for more effective production was still important and motivated investments in production facilities – cranes with more lifting capacity, for example.

Around the turn of the millennium, there were major changes in ownership and corporate structure in the yard industry. Since the yard crisis, it had become normal that firms were bought and sold. Whereas so far the two giants in engineering and yard production, the Aker and Kvaerner groups, had bought other firms, they were now candidates to be bought. Kvaerner followed an aggressive strategy of buying firms, among them shipyards, at home and abroad, and by 1992 was the biggest shipbuilder in Europe.⁴⁸ Aker was still big in oil construction, cement and the building industry, but the price of the company's shares was low. In 1996 an outsider investor bought a large share of the company, and eventually gained control of the whole group. The shift in ownership started a series of reorganizations of the industry. As the new unites were integrated, the takeover of a smaller group of offshore firms resulted in an internal reorganization in Aker. Then, because Kvaerner was in financial trouble after such gigantic acquisitions, Aker took over Kvaerner in 2001. The large

⁴⁸ Osland (1992, 31).

engineering departments of both firms were merged. Eventually, the parts producing for the oil sector became part of Aker Solutions, a subsidiary firm directed towards oil services at the global level in more than 30 countries. Finally, the yards producing the big offshore installations were split from Aker Solutions under the name Aker t. Aker thereby became the absolutely dominant player in the offshore deliverance market.

Capital concentration in the branch implied that domestic competition was considerably reduced. But the oil companies had the option to order abroad. When the financial crisis starting in 2008 hit the large yards in South Korea and Japan, it immediately affected the prices for oil installations. Large contracts were signed with yards in South Korea and Singapore. Aker is a relatively small firm compared to the large Asian companies, and is not well equipped to meet competition. The firm has managed to secure work after this setback, however, and as of 2019 Aker's yards still have orders to keep the work force busy. But the future is uncertain. Union representatives claim that their company's strong asset is relations of close cooperation with management. They maintain that, despite a relatively high wage level, this is what makes the Norwegian yard worker competitive.

The new ownership in Aker and its takeover of Kvaerner also affected shipbuilding. The takeover in 1996 brought with it a group of smaller shipbuilding yards into Aker. With the acquisition of Kvaerner, many more was joined, and Aker became the largest shipbuilder in Europe, with 20000 employees in 17 yards around the world.⁴⁹ The shipbuilding division was sold in 2007, and was soon bought by the South Korean STX Europe. Later, Italian Fincantieri took over ownership. Some of the small yards on the west coast went through a series of ownership changes during this process.

Commercial conditions for building ships in Norway were now quite different from those prevailing in the 1970s and 80s. Today capital running Norwegian yards is less bound to production facilities. Instead of seeking orders to keep its yard running, corporations tend to first secure orders and thereafter buy a yard that fits the task. Yard ownership has become a more short-sighted obligation. What still ties owners' interests to the social realities of the economic life is the competence which the yard organization represents. Without the expertise and routine of engineers,

⁴⁹ Ankerløyken-eventyret.

plate workers, pipe fitters, welders and electricians, profitable production would be difficult. Quite often, when a yard is bought by a new owner, employees stay, such that local yard organizations tend to be preserved through ownership changes. Surprisingly in spite of this trend and strong oscillations in markets, many yard sites are still in business,

If we take a look at official statistics again, we see that by the end of the 1980s the shipbuilding industry had suffered a serious setback. In 2000, the number of workers employed in ship-building was reduced to less than half of those employed in the offshore sector.⁵⁰ Yet, many yards were still active. In part such reduction was due to the fact that some jobs were exported. The yards no longer tried to compete with low-cost countries for steel work. Orders placed with Norwegian firms usually involved having the hull built abroad, at first quite often in Poland, while the design, other engineering work, and the outfitting were done in Norway. Moreover, ship types had changed into more complex and technologically advanced ones, for example chemical tankers, gas tankers and supply ships, though these last ones were small. Norwegian merchant fleets demanded far larger ships, and had them built abroad. Yards in Norway concentrated on niche markets where the value added was high per ton of steel. A large percentage was exported.⁵¹ The industry has experienced a production, market relations, and capital structure internationalisation. Takeovers by new owners may open opportunities in new markets. In 2019 there are almost no supply ships in order, but yards have contracts to build 16 smaller high standard cruise ships. The Vard group, owned by Italian Fincantieri, are to build seven of them. Hulls are built in Vard's yards in Romania, and equipped in Norway.⁵²

At the formal level, labour relations in the industry remain unchanged. In the dominating group Aker, union representatives have influence at all levels in the organisation and often play an important role in decision making. Internal relations in Aker is a good example of the reality of the Nordic Model. Their main characteristics are a high degree of mutual trust and of close cooperation between managers, engineers and production workers. In particular, they join forces in the never ending aim to lower production costs. Relations between workers' representatives

⁵⁰ See table 3.

⁵¹ Osland (1992, 18)

⁵² *Klassekampen* 10.08. 2019.

and management has probably become more intimate and based on faith. Workers are allowed more freedom in executing their tasks, that is at least do they have a degree of influence over their own work. This development does not seem to change local union representatives' determination to defend what they conceive as the rights of their members. But, with their inclusion in discussions about how to run the workplace, they also tend to understand management's point of view in upcoming issues. Union representatives in Aker have access to much of the same information as top managers, and will renounce on claims if it is a question of the firm's survival. At the same time, formal industrial relations are intact on all levels, and the national union is still influential.

On the other hand, the workers' local unions are not in the same strong position as earlier. Since the 1990s, firms have downsized their permanent work forces and rely on large groups of temporary workers hired from manpower firms. In October 2019, for example, the number of temporary workers at the Aker yard at Stord is twice the number of the permanent ones. Few of the short-term employed are organized. The same situation prevails in many yards.⁵³ The high grade of organisation which characterized yard workers is reduced. This means that the majority of the employed are not part of the relations of cooperation in which the permanent workers are included. They may also be unable to communicate with each other because they speak different languages.

8. Concluding remarks

The firms of the shipbuilding industry managed to establish production based on efficient technical and organisational principles in the years following the Second World War, and to expand production and employment until the crisis of the 1970s. Undoubtedly, a condition for this was that the firms managed to attract capital needed for investments that enabled the transition to the new production system. Political regulations contributed to this by making shipbuilding profitable. When the system yielded gains through cost reductions during the whole period, this owed much to the cooperative attitude of the workers. Through their local unions they participated actively in productivity work, with constant increases in productivity on the premise that they would get a share in productivity gains.

⁵³ *Klassekampen* 11.10. 2019.

Later on, the development of a market for oil extractions offshore installations represented new market opportunities for several shipbuilding yards, which in terms of employments is nowadays more important than the actual building of ships. Direct state intervention secured a position in the market for Norwegian yards. Intensified global competition that Norwegian firms experienced from the 1990s on, aggravated by the financial crisis of 2008 and several instances of oil price reductions, intensified the pressure for cost reductions, made its impact on industrial strategies, and led firms to be more internationally oriented.

The yard industry of today is a very different business and workplace compared to what it was in the early postwar years. Production in general is high-tech, firms are more integrated by common ownership, and production units in part of the industry are more prone to be sold and bought. Capital concentration has become very high in parts of the branch, and domestic competition is quite reduced. The core of the industry, producing the huge constructions for the offshore industry, is to a large extent controlled by one firm, Aker. But this part of the industry is exposed to global competition to an extent which can be compared to the situation in the supertanker era.

The workforce employed in the yards has also changed. Manpower today is more qualified, with a larger share of engineers and skilled workers having higher and more specialised skills in a high-value activity. The steel work that until the 1970s was the most important, is now almost always outsourced to other countries. It has become commercially almost impossible to build hulls in Norway. Instead, they may be built as far away as China, to be later equipped at yards in Norway.

Seen from the point of view of individual production units, work security has been reduced due to the more frequent acquisitions and sell-outs by capital operating in a global arena. Even if the units often continue operating under new owners, such changes influence the bargaining power of employees' unions. Recourse to hiring temporary workers works in the same direction. Conditions of organized working life in this branch of industry have also have changed considerably in this branch of industry that traditionally had a strongly organized work force.

Appendix

Table 1
Employment in the shipbuilding industry relative to the metal industry and industry

	Industry		Metal industry		Shipbuilding industry		Metal's share of total	Shipbuilding's share of total
	Establishments	Employed	Establishments	Employed	Establishments	Employed		
1950	6.166	257.399	1.391	72.859	85	17.702	28,3	6,9
1955	7.677	293.975	1.708	83.111	61	19.123	28,3	6,5
1960	8.672	307.610	2.000	89.538	88	20.010	29,1	6,5
1965	18.238	367.518	4.577	112.132	96	23.152	30,5	6,3
1970	14.990	369.871	3.397	116.772	162	28.397	31,6	7,7
1975	14.357	383174	2.275	131.911	224	32.736	34,4	8,5

Source: Statistical Yearbook several years, and Industrial Statistics, Statistics Norway.

Table 2.
Firms building and repairing steel ships after size, 1941 and 1972

	1941			1972		
	Firms	Employed	Employed per firm	Firms	Employed	Employed per firm
Large firms	18	8.850	491,7	16	19.159	1.197,40
Medium sized				61	26.609	436
Small firms	105	3.484	33,2	133	3.473	28,1
All firms	123	12.334	100,3	194	30.352	156,4

Sources: Aamundsen 1941:18f., NOU 1973:58: 8ff, and Production statistics, Industrial statistics, Statistics Norway.

Table 3
Total output of shipbuilding in Norway,
new ships built for Norwegian shipping firms and the share built in
Norway, 1957-1990

	Total output	Built in Norway		Built abroad		Share of tonnage built in Norway
	Grt	Ships	Grt	Ships	Grt	Percent
1957	197	60	185	78	722	20,4
1960	243,2	38	266	51	532	33,3
1965	474,2	56	366	75	1686	17,8
1970	706	64	464	46	1762	20,8
1975	1073	62	585	93	2572	18,5
1980		34	105	10	373	22
1985		20	72	14	496	12,7
1990		19	17	20	481	3,4

(Concerns merchant vessels of more than 100 grt.)

Source: Historisk statistikk 1994, table 20.9.

Table 4
Establishments and number of employed 1970 – 2000

38411 building of ships. I 1000 kr			38241 Manufacture of oil and gas well machinery (Oil rigs, from 1993: 1993: Oil platforms)		Total	
Year	Establishments	Persons engaged	Establishments	Persons engaged	Establishments	Persons engaged
1970	162	28397			162	28397
1975	224	32736	38	7602	262	40338
1980	216	27375	57	10050	273	37425
1985	142	13609	84	15821	226	29430
1990	126	10079	75	14248	201	24327
1995	111	9527	79	17906	190	27433
2000	162	8498	105	19658	267	28156
2007					485	21441
2010					449	22522
2015					422	25702
2017					382	18229

Source: Industrial statistics, Statistics Norway

9. Sources used

Most of the statistical material quoted in this article comes from Statistic Norway, the state bureau. In addition, we have also drawn on a survey conducted in 1941 by yard manager C.N.R. Aamundsen . Special government commissions in the 1970s collected statistical overviews over the major firms, published in NOU 1973:58, NOU 1974:51 and 1978:4. The yearly reports of the Branch Council for the Shipbuilding Industry, as summarized by the national union of metalworkers, is quoted as a source for both statistical data and industrial policies.

The material on the Aker Group and its Stord yard is collected by members of a research group focusing on industrial relations in the 1990s: Grove and Heiret 1996, Mjelva 1995 and 2005 and Haga 1989. In 2018 and 2019, we participated in a project to write the history of the yard together with Martin Byrkjeland, Knut Grove, Trond Erlien and Eva-Marie Tveit (Byrkjeland & al. 2019). We have consulted the yard archive and conducted extensive interviews with people in key positions in the firm, many of them with a career at the yard starting in the 1980s. The interviews are the most important sources for our discussion of technical and economic development since the crisis of the 1970s.

10. Literature

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