



## BRODOGRADNJA

## SHIPBUILDING

### UVOD

Tradicionalno orijentirani na more i pomorstvo, žitelji hrvatske obale Jadrana morali su svladati tehniku gradnje brodova. Višestoljetni kontinuitet te gradnje potvrđuje se visokom kvalitetom i tehničkim rješenjima hrvatskih brodograditelja koji u svjetskim razmjerima imaju značajnu ulogu.

Suvremena hrvatska brodograđevna industrija na svjetskom je tržištu više od pola stoljeća i proizvodi gotovo isključivo za strane brodovlasnike. Orijentacija na proizvodnju po zahtjevima kupca koja svaki brod ili seriju čini unikatnim proizvodom, osigurala je hrvatskim brodogradilištima zavidan ugled među brodovlasnicima te brojna priznanja u svjetskim pomorskim krugovima.

### BRODOGRAĐEVNA DJELATNOST

Brodogradnja je industrijska grana koja posluje na globalnom svjetskom tržištu, ima prepoznatljiv i kvalitetan proizvod i gotovo je u cijelosti orijentirana na izvoz.

S aspekta vanjskotrgovinske razmjene i gospodarske strategije Vlade RH, brodogradnja je jedna od važnijih grana

### INTRODUCTION

Traditionally oriented toward the sea and the shipping trade, the people of the Croatian Adriatic coast have necessarily had to master the technology of shipbuilding. Centuries of shipbuilding continuity are reflected in the high quality of technical solutions designed by Croatia's shipbuilders, who also play an important role internationally.

The modern Croatian shipbuilding industry has been present on the world market for almost half a century and works almost exclusively for foreign shippers. Customised production methods that make each ship or series unique have secured the Croatian shipbuilding industry an enviable reputation among ship owners as well as numerous awards from nautical circles around the world.

### SHIPBUILDING INDUSTRY

Shipbuilding is an industrial branch that operates on the global market, has recognisable and quality products and is entirely oriented towards export.

In terms of foreign trade and the Croatian Government's economic strategy, shipbuilding is one of the most impor-

## UKUPNI PRIHOD TVRTKI BRODOGRAĐEVNE DJELATNOSTI TOTAL REVENUE OF SHIPBUILDING COMPANIES

Godina Year	Ukupni prihod (000 kn) Total revenue (in HRK 000)	Broj zaposlenih Number of employees
2000.	5.899.061	13.952
2001.	7.060.176	15.127
2002.	8.451.942	14.753
2003.	6.245.992	15.746
2004.	6.699.988	15.422
2005.	7.547.861	15.848
2006.	8.796.519	16.010
2007.	8.832.455	16.445

Izvor: FINA, DZS, Obrada: HGK  
Source: FINA, CBS, Compiled by: CCE

hrvatske industrije. U robnoj razmjeni s inozemstvom brodograđevna industrija u izvozu sudjeluje oko 12 posto.

Prema službenim podacima, u Hrvatskoj je registrirano sedam velikih, 14 srednjih i 352 mala brodogradilišta koja su u 2007. godini zapošljavala oko 16.500 djelatnika i ostvarila ukupni prihod 8.832,454.862 HRK.

Izvoz brodograđevnih radova (ubraja se u nerobni izvoz) također pridonosi vanjskotrgovinskoj bilanci brodograđevnih djelatnosti.

U velikim je brodogradilištima u tijeku proces restrukturiranja, što će pridonijeti porastu njihove konkurentske sposobnosti. Traju i pripreme za snažniji prodor na zahtjevno tržište odobalnih objekata te na tržište megajahti.

Iako je dio domaće proizvodnje brodica namijenjen izvozu malen, ohrabruje činjenica da je u porastu te da, osim susjednih Slovenije i Italije, obuhvaća i Skandinaviju, a uskoro se očekuju hrvatske brodice i na tržištima Nizozemske i Velike Britanije.

Ukupna vrijednost uvezenih brodica doseže 85,5 milijuna USD, a većina tih plovila (80% motornih jahti i 85% jedrilica) koristi se u charteru, što znači da ima značajnog prostora za proizvodnju i plasman brodica iz domaćih pogona.

### PROIZVODNI PROGRAM

S obzirom na opseg poslovanja, kapacitete i veličinu plovila koja grade, brodogradilišta se mogu podijeliti u tri skupine:

- velika brodogradilišta
- srednja brodogradilišta
- mala brodogradilišta

### VELIKA BRODOGRADNJA

U proizvodnji velikih preokooceanskih novogradnji zastupljeni su brodovi svih vrsta i namjena nosivosti do 170.000 tdw.

- Brodovi za prijevoz tekućih i rasutih tereta:
  - tankeri za sirovu naftu, tankeri za naftne derivate, tankeri za kemikalije
  - ore carrieri, bulk-carrieri, OBO-carrieri.
- Brodovi za prijevoz suhih tereta:
  - kontejnerski i višenamjenski brodovi, brodovi hladnjače
  - brodovi za prijevoz automobila i kamiona te željezničkih vagona, RO-RO brodovi.

tant sectors of Croatian industry. In overall foreign trade, the shipbuilding industry has an approximately 12% share of total exports.

According to official data, there are 7 big, 14 middle-sized and 352 small shipyards, which employed some 16.500 employees in 2007 and had revenues totalling HRK 8,832,454,862.

The export of shipbuilding services (classified as a non-commodity export) also contributes to the foreign trade balance of the shipbuilding industry.

Large shipyards are undergoing a process of restructuring, which will contribute to their increased competitiveness. Preparations for a stronger penetration of demanding markets for offshore structures and mega-yachts are also under way. Even though domestic boat production for export is relatively insignificant, the fact that it is in continuous growth and includes neighbouring Slovenia and Italy as well as Scandinavia, Croatian boats are anticipated on the markets of the Netherlands and Great Britain soon.

The total value of imported boats is almost US\$85.5 million, while the size of these vessels (80% motor yachts and 85% sailing boats) are used for charter, which means there is significant space left for production and marketing of boats from domestic production plants.

### PRODUCTION PROGRAM

In terms of the scope of business, capacity and size of craft built, Croatian shipyards can be classified in the following three groups:

- Large shipyards
- Middle-sized shipyards
- Small shipyards

### LARGE SHIPBUILDING

The production of large new ocean-going ships includes ships of all types and purposes, with deadweight up to 170,000 dwt:

- Transport ships for liquid and bulk cargo:
  - tankers for crude oil, petroleum products, chemicals
  - ore-carriers, bulk-carriers, OBO-carriers
- Transport ships for dry cargo:
  - container and multi-purpose ships, refrigerator ships
  - car and train transport ships, RO-RO ships

**BRODOVI ISPORUČENI U BRODOGRADILIŠTIMA 3.MAJ, BRODOSPLIT, BRODOTROGIR, KRALJEVICA, VIKTOR LENAC I ULJANIK U PERIODU 1996. - 2007.**

**SHIPS DELIVERED IN SHIPYARDS 3.MAJ, BRODOSPLIT, BRODOTROGIR, KRALJEVICA, VIKTOR LENAC I ULJANIK 1996 - 2007**

Godina	Broj brodova	dwt	gt	cgt	USD
1996	14	571.511	365.006	270.661	405.055.834
1997	8	190.912	122.224	88.188	148.710.896
1998	12	462.342	280.433	223.188	336.456.237
1999	11	319.059	232.772	180.754	276.287.035
2000	14	324.572	330.700	237.017	373.615.441
2001	14	411.969	307.650	210.760	284.422.666
2002	20	525.175	417.165	317.982	424.202.386
2003	18	725.603	495.180	330.366	433.624.822
2004	26	956.808	625.620	442.750	596.308.578
2005	23	858.032	535.664	393.788	571.846.990
2006	29	776.902	561.326	415.957	698.286.214
2007	22	834.907	703.123	446.237	759.712.825
UKUPNO	211	6.957.792	4.976.863	3.557.648	5.308.529.924

Izvor: Hrvatska brodogradnja-Jadranbrod d.d.  
Obrada: HGK

Source: Croatian Shipbuilding Corporation  
Compiled by: Croatian Chamber of Economy

**BROJ ZAPOSLENIH U VELIKIM BRODOGRADILIŠTIMA  
NUMBER OF EMPLOYEES IN LARGE SHIPYARDS  
3. MAJ, BRODOSPLIT, BRODOTROGIR, KRALJEVICA,  
ULJANIK, VIKTOR LENAC**

Godina / Year	
2000.	8.464
2001.	9.208
2002.	9.807
2003.	9.702
2004.	9.529
2005.	9.647
2006.	9.503
2007.	9.312

**IZVADAK IZ SVJETSKJE KNJIGE NARUDŽBI (30. travnja 2008.)  
NEW BUILDINGS WORLD ORDER BOOK (April 30, 2008)**

	ZEMLJA COUNTRY	BROJ BRODOVA NUMBER	NOSIVOST (u tdw) DEADWEIGHT(in tdw)
1.	Južna Koreja Korea (South)	2.277	193.650.824
2.	Kina China	3.186	175.389.640
3.	Japan Japan	1.411	99.158.339
4.	Filipini Philippines	114	8.552.670
5.	Vijetnam Vietnam	255	5.442.776
6.	Rumunjska Romania	77	3.936.216
7.	Tajvan Taiwan	67	3.518.930
8.	Turska Turkey	265	3.375.480
9.	Brazil Brazil	36	3.297.370
10.	Hrvatska Croatia	49	1.997.725

Izvor: Fairplay newbuildings, ožujak 2007.

Source: Fairplay newbuildings, March 2007

- Putnički brodovi, brodovi za prijevoz automobila i putnika
- Brodovi posebne namjene
- Plutajući dokovi
- Odobalni (off-shore) objekti:
  - platforme za istraživanje i eksploataciju naftnih i plinskih nalazišta u podmorju
  - brodovi dizalice za opsluživanje platformi
  - brodovi za polaganje cjevovoda i kabela
  - brodovi za opskrbu
  - lučki i oceanski tegljači i dr.
- Passenger ships, ships for car and passenger transport
- Special-purpose ships
- Floating docks
- Off-shore structures:
  - platforms for the research and exploitation of underwater oil and gas fields
  - auxiliary crane ships for platforms
  - cable- and pipe-laying ships
  - supply ships
  - harbour- and ocean towboats etc.

Mnogim su brodarima danas zanimljive rekonstrukcije i preinake brodova. Na tom području je hrvatska brodograđevna industrija stekla visoke reference i često je odredište svjetskih brodarar.

Velika brodogradilišta (brodograđevne grupe) ukupno zapošljavaju 11.438 djelatnika, a njih 9312 radi u brodogradilištima. Još je otprilike 1500 tvrtki (kooperanata, proizvođača brodske opreme, davatelja usluga i trgovaca) izravno vezano za brodogradnju; oni su u 2007. godini ostvarili promet od približno 2.300 milijuna kn. Prema svjetskoj knjizi narudžbi od 30. travnja 2008. (prema kriteriju nosivosti ugovorenih brodova), hrvatska brodogradnja je na 14. mjestu sa 49 ugovorenih brodova nosivosti 1,997.725 tdw i kapacitetima popunjenim gotovo do kraja 2011. godine.

### GRADNJA I POPRAK BRODOVA OBALNE PLOVIDBE

Život na otocima bi bio nezamisliv bez brodova, jedine komunikacije s kopnom. Zbog toga je gradnja brodova tradicionalno razvijena djelatnost. Smješteno na otocima i u priobalju, gradnjom, održavanjem i popravcima brodova i brodica male obalne plovidbe: trajektima, brodovima za turistička i kružna putovanja, ribarskim brodovima i brodovima za javne potrebe - policije, carine, lučke kapetanije, protupožarne zaštite, zaštite okoliša bavi se petnaestak srednjih brodogradilišta s oko 1500 zaposlenih: Tehnomont - Pula, Heli - Pula, Lošinjska plovidba Brodogradilište - Mali Lošinj, Brodogradilište CRES, Brodogradilište KRK, Brodogradilište PUNAT - Punat, otok Krk, Nauta Lamjana - Kali, Brodogradilište i marina BETINA - Murter, Nautički centar PRGIN - Remontno brodogradilište ŠIBENIK - Šibenik, Montmontaža-Greben - Vela Luka, Nautički centar MOKOŠICA - Mokošica itd. Ukupni je prihod te grupe brodogradilišta u 2006. godini iznosio 514,2 milijuna kn.

U budućnosti, ta brodogradilišta mogu računati na kontinuiranu zaposlenost kapaciteta na modernizaciji i obnovi turističke i ribarske flote, kao i na narudžbe za gradnju brodova obalne straže.

Today, many shippers are interested in ship reconstruction and remodelling. The Croatian shipbuilding industry has earned high references also in this field, and is therefore a frequent provider of such services for shippers around the world.

Large shipyards (shipyard groups) employ 11,438 employees in total, 9,312 of them working in shipyards. A further 1,500 companies (sub-contractors, ship equipment producers, service providers and sales representatives) are directly involved in shipbuilding and achieved revenues of HRK 2,300,000.00 in 2007. According to world order book from April 30, 2008 (in accordance with the deadweight criteria of contracted ships) Croatian shipbuilding ranks 14th with 49 contracted ships of 1,997,725 dwt and with a full order book until the end of 2011.

### BUILDING AND REPAIR OF COASTING VESSELS

Life on the islands would be unthinkable without ships, the only communication with the mainland. Shipbuilding is, therefore, one of the traditional commercial activities of the Croatian islands. Situated along the coast and on the islands, they build and repair ships and boats for coastal navigation. These include ferries that connect the islands and the coast, cruise ships, fishing boats, ships for public service (police, customs, fire protection, environmental protection etc.). About 15 middle-sized shipyards employ around 1,500 employees: Tehnomont - Pula, Heli - Pula, Lošinjska plovidba Shipyard - Mali Lošinj, Shipyard CRES, Shipyard KRK - Krk and Shipyard PUNAT - Punat, Nauta Lamjana - Kali, Shipyard and Marina BETINA - Murter, Nautical Center PRGIN - Repair shipyard ŠIBENIK - Šibenik, Montmontaža-Greben - Vela Luka, Nautical Center MOKOŠICA - Mokošica, etc. The total revenue of this shipbuilding branch in 2006 was HRK 514.2 million.

These shipyards can undoubtedly count on the continuous employment of their capacities in modernisation and reconstruction of the tourist and fishing fleet as well as on new orders for coast guard vessels.

### NAJVEĆE BRODOGRAĐEVNE TVRTKE PREMA UKUPNOM PRIHODU 2007.

#### THE LARGEST SHIPBUILDING COMPANIES BY TOTAL INCOME IN 2007

#### DM 3511 GRADNJA I POPRAK BRODOVA / BUILDING AND REPAIR OF COASTING VESSELS

Redni broj Number	Naziv tvrtke Company	Ukupni prihod (u 1000 kn) Total Income (in 1000 HRK)	Broj zaposlenih Number of employees
1.	BRODOSPLIT BRODOGRADILIŠTE d.o.o.	2.232.281	3.025
2.	ULJANIK BRODOGRADILIŠTE d.d.	1.599.184	2.063
3.	3. MAJ BRODOGRADILIŠTE d.d.	1.429.977	2.258
4.	BRODOTROGIR d.d.	729.149	1.221
5.	BRODOGRADILIŠTE KRALJEVICA d.d.	325.958	532

## NAJVEĆE BRODOGRAĐEVNE TVRTKE PREMA UKUPNOM PRIHODU 2007.

### THE LARGEST SHIPBUILDING COMPANIES BY TOTAL INCOME IN 2007

DM 3512 GRADNJA I POPRAK ČAMACA ZA SPORT I RAZONODU / BUILDING AND REPAIR OF SPORTS AND LEISURE BOATS AND SHIPS

Redni broj Number	Naziv tvrtke Company	Ukupni prihod (u 1000 kn) Total Income (in 1000 HRK)	Broj zaposlenih Number of employees
1.	AD BRODOVI d.o.o.	39.074	108
2.	PIČULJAN MARINE d.o.o.	23.482	24
3.	PRINZ ADRIATIC d.d.	20.348	49
4.	BRODOGRADILIŠTE PUNAT d.o.o.	18.867	26
5.	SAS – VEKTOR d.d.	18.592	56

Izvor: FINA, Obrada HGK

Source: Financial Transactions Bureau. Processing: CCE

## GRADNJA I POPRAK BRODICA I BRODOVA ZA SPORT I RAZONODU

Osim brodogradilišta srednje veličine, tradicija hrvatske brodogradnje vezana je za proizvodnju brodica za privredne svrhe (ribarstvo, prijevoz putnika) ili za obiteljske izlete i/ili krstarenja. Nagli razvoj nautičkog turizma i pojava novih materijala utjecali su na pravce razvoja te djelatnosti prema gradnji, popravcima i održavanju brodica za sport i razonodu. Interes za tu djelatnost raste i danas, ne samo duž jadranske obale nego i u unutrašnjosti, tako da se danas brodice za sport i razonodu, pretežno iz stakloplastike proizvode u više od 80 pogona, a trend osnivanja novih nastavlja se i dalje.

U 2007. godini u toj je grupaciji bilo zaposleno 660 radnika, a ostvaren je ukupni prihod od 182 milijuna kn. Prema procjeni HGK, proizvedeno je više od 1000 plovila.

Uz osnivanje novih pogona i usvajanja proizvodnje novih modela brodica, proizvođači su sve prisutniji na svjetskom tržištu koje prepoznaje tradicionalnu kvalitetu hrvatskih brodograditelja. U tom se pogledu posebno ističe tvrtka AD BRODOVI - Solin, nositelj laskavog priznanja "Europske jahte za 2007. godinu" osvojenog na sajmu nautike u Düsseldorfu za jedrilicu Salona 37. Pored nje istaknuti proizvođači su i ELAN MOTORNI BRODOVI - Obrovac, PRINZ ADRIATIC - Oroslavje, PIČULJAN MARINE - Rab, SAS-VEKTOR - Zadar, DAMOR - Kaštel Sućurac, MARINA SPORT - Novi Vinodolski, DONAT BOATS - Zadar, ORKA STUDIO - Zagreb, KVARNER - Rab, REFUL MARINE - Sisak, MARUŠIĆ - Brist, GRAŠO - Pula itd.

## BRODOGRAĐEVNI RADOVI

Specifičan su oblik ponude u vezi s brodogradnjom usluge brodogradilištima i brodovlasnicima:

- projektiranje i razrada radioničke dokumentacije
- izrada brodskih sekcija ili obavljanje kooperantskih radova (zavarivačkih, cjevarskih, montažnih i sličnih radova)
- antikorozivna zaštita.

## BRODSKA OPREMA

Uz hrvatsku brodogradnju razvija se prateća industrija brodske opreme i usluga koja u potpunosti zadovoljava međunarodne norme brodograđevne industrije s bogatim iskustvom i prestižnim referencama u opremanju najsuvremenijih brodova.

## BUILDING AND REPAIR OF SPORTS AND LEISURE BOATS AND SHIPS

Apart from medium-sized shipyards, the tradition of Croatian shipbuilding is closely related to the building of commercial vessels (fishing boats, passenger ships) and/or cruiser vessels and leisure boats for family use. The rapid development of nautical tourism and the availability of modern materials have prompted great interest in the building, repair and maintenance of sports and leisure boats and ships, not only along the Adriatic coast but also inland. Today almost seventy companies are active in the production of fibreglass boats and the trend of establishing new ones continues.

In 2007 this branch of industry produced total revenues of HRK 182 million and had 660 employees. The Croatian Chamber of Economy estimates that more than 1,000 vessels have been built.

As the result of the establishment of new shipyards and the implementation of new technologies in the production of modern vessels, Croatian boats have become increasingly sought after on the international market which recognised the quality of workmanship of Croatian shipbuilders. One of the most prominent shipbuilding companies is AD BRODOVI from Solin, the winner of the prestigious award "European Yacht of the Year 2007" on Boat Show in Düsseldorf for its sailing boat Salona 37. Other recognised Croatian shipbuilding companies are: ELAN MOTORNI BRODOVI - Obrovac, PRINZ ADRIATIC - Oroslavje, PIČULJAN MARINE - Rab, SAS-VEKTOR - Zadar, DAMOR - Kaštel Sućurac, MARINA SPORT - Novi Vinodolski, DONAT BOATS - Zadar, ORKA STUDIO - Zagreb, KVARNER - Rab, REFUL MARINE - Sisak, MARUŠIĆ - Brist, GRAŠO - Pula, etc.

## SHIPBUILDING JOBS

Specific types of shipbuilding activity are services to shipyards and ship owners:

- design and elaboration of workshop documentation
- manufacture of ship sections or subcontractor work (welding, pipe laying, fitting and similar jobs)
- anticorrosive protection.

## SHIP EQUIPMENT

Supportive ship equipment and service industries have developed alongside the Croatian shipbuilding industry. They have gained rich experience and earned prestigious

Pri Hrvatskoj gospodarskoj komori djeluje Zajednica proizvođača brodske opreme, što okuplja oko 200 proizvođača brodske opreme koji zapošljavaju 9000 djelatnika i ostvaruju ukupni prihod približno 650,000.000 EUR (od toga je oko 22 posto, odnosno 143,000.000 EUR vezano za proizvodnju brodske opreme).

Samo hrvatskim brodogradilištima su u 2007. godini isporučili brodsku opremu u vrijednosti približno 110,000.000 EUR, a s njima već sada imaju potpisane ugovore za brodove koji će se graditi do 2011. u vrijednosti 160,000.000 EUR.

## ● PRATEĆE INSTITUCIJE

U brodograđevnu industriju svakako valja ubrojiti i prateće djelatnosti, projektne organizacije, isporučitelje materijala i opreme te svakako i institucije "podrške":

Hrvatska brodogradnja - Jadranbrod d.d., Zagreb  
Brodarski institut, Zagreb

Fakultet strojarstva i brodogradnje, Zagreb

Fakultet elektrotehnike i računarstva, Zagreb

Tehnički fakultet, Rijeka

Fakultet elektrotehnike, strojarstva i brodogradnje, Split  
Veleučilišta (Zagreb, Rijeka, Split)

Hrvatski registar brodova, Split

Okosnicu razvoja i proizvodnje hrvatske brodograđevne industrije čine stručnjaci obrazovani u visokoškolskim ustanovama i stručnim školama koji jamče visoku razinu kvalitete.

Značajan doprinos u kreaciji broda imaju Brodarski institut i fakulteti, posebno na definiranju forme, sustava propulzije i upravljivosti broda, rješavanju problema vibracija i buke te konačne verifikacije broda na pokusnoj plovidbi.

Brodarski institut raspolaže velikim brojem visokoškolskih stručnjaka (doktori znanosti, magistri, dipl. inženjeri), a stručna i znanstvena djelatnost obavlja se u teorijskom i eksperimentalnom radu u više od 20 laboratorija organiziranih u različitim sektorima.

Brodarski je institut u rangu vodećih europskih institucija po kadrovskim i laboratorijskim resursima, iskustvu i opremi, od računalnih sustava do eksperimentalnih mjerenja na modelima brodova, kao i u naravi (otpor broda, propulzija, pomorstvenost, upravljivost i porinuće broda).

## ● UPRAVLJANJE KVALITETOM

U gradnji brodova hrvatska brodogradilišta pridaju veliku pozornost kvaliteti svojih radova i proizvoda. Brodogradilišta posjeduju certifikate iz skupine ISO 9000, a u postupku su prihvaćanja i ostalih značajnih certifikata u brodograđevnoj industriji (primjerice ISO 14001, OSHAS 18001 i dr.).

references in equipping state-of-the-art ships.

Within the Croatian Chamber of Economy there is an Affiliation of Marine Equipment Manufacturers, bringing together about 200 ship equipment manufacturers which employ 9,000 workers with annual revenue of approximately EUR 650,000,000 (of which 22% or EUR 143 million is related to production of marine equipment). In 2007 these companies supplied Croatian shipyards with the marine equipment in the approximate value of EUR 110 million and already negotiated and concluded contracts for the construction of new ships to the value of EUR 160 million until 2011.

## ● SUPPORTING ESTABLISHMENTS

Supporting activities, design offices, material suppliers and, above all, assistance institutions should also be considered part of the shipbuilding industry:

CROATIAN SHIPBUILDING CORPORATION - JADRANBROD, Zagreb

INSTITUTE OF NAVAL ENGINEERING, Zagreb

FACULTY OF MECHANICAL ENGINEERING AND NAVAL ARCHITECTURE, Zagreb

FACULTY OF ELECTRICAL ENGINEERING AND COMPUTING, Zagreb

FACULTY OF ENGINEERING, Rijeka

FACULTY OF ELECTRICAL AND MECHANICAL ENGINEERING AND NAVAL ARCHITECTURE, Split

Community colleges (Zagreb, Rijeka, Split)

CROATIAN REGISTER OF SHIPPING, Split

The backbone of development and the production of Croatian shipbuilding industry are the experts educated in institutions of higher education and vocational schools which guarantee a high level of quality. The Institute of Naval Engineering and its faculties play a significant role in creating a ship, particularly in defining the shape, propulsion and steering system, handling, vibration and noise problems, and also in ultimate ship certification after test navigation.

The Institute of Naval Engineering has a large number of highly qualified experts (Ph.D., M.Sc., and graduate engineer level), and professional and scientific activity is pursued on theoretical and experimental levels in over 20 laboratories organised into different departments.

The Institute of Naval Engineering ranks among the leading European institutions in terms of its human and laboratory resources, experience and equipment, from computer systems to experimental measurement performed on both model and actual ships (ship's resistance, propulsion, steerability and launching).

## ● QUALITY MANAGEMENT

When building ships, Croatian shipyards pay great attention to the quality of their work and products. The shipyards were awarded certificates to ISO 9000 standards; the issuing of other significant certificates for shipbuilding industry is in progress (e.g. ISO 14001, OSHAS 18001, etc.).

## PROMOCIJA U INOZEMSTVU

U organizaciji Hrvatske gospodarske komore i Hrvatske brodogradnje Jadranbrod d.d. velika brodogradilišta i proizvođači brodske opreme redovito sudjeluju na međunarodnim sajmovima brodogradnje:

- NOR-SHIPPING u Oslu, Norveška
- POSIDONIA u Pireju, Grčka
- SMM u Hamburgu, Njemačka
- NEVA u St. Petersburgu, Rusija

Mala i srednja brodogradilišta redovito izlažu na specijaliziranim sajmovima nautičke proizvodnje u Genovi, Düsseldorfu, Splitu, Rijeci i Zagrebu gdje pobuđuju veliko zanimanje kupaca.

## INTERNATIONAL PROMOTION

Croatian Shipbuilding Corporation - Jadranbrod, Zagreb, and the Croatian Chamber of Economy organise regular attendance of international shipbuilding fairs by large shipyards. The fairs include:

- NOR-SHIPPING, Oslo, Norway
- POSIDONIA, Piraeus, Greece
- SMM, Hamburg, Germany
- NEVA, St. Petersburg, Russia

Small and medium-sized shipyards make regular presentations at specialised nautical fairs in Genoa, Düsseldorf, Split, Rijeka and Zagreb where they attract great interest from numerous customers.





**HRVATSKA GOSPODARSKA KOMORA  
SEKTOR ZA INDUSTRIJU**

Direktor:  
Ruđer Friganović, dipl. ing.  
Osoba za kontakt:  
Zoja Crnečki, dipl.ing.  
Mario Polla, dipl.ing.

Draškovićeva 45  
HR-10000 ZAGREB  
Tel.: +385 (0)1 4606-701, 4606-705,  
Fax: +385 (0)1 4606-737  
E-mail: [industrija@hgk.hr](mailto:industrija@hgk.hr)

**CROATIAN CHAMBER OF ECONOMY  
INDUSTRY AND TECHNOLOGY DEPARTMENT**

Managing Director:  
Ruđer Friganović, B.Sc.EE.  
Contact Person:  
Zoja Crnečki, B.Sc.ME.  
Mario Polla, B.Sc.ME.

Draškovićeva 45  
HR-10000 ZAGREB, CROATIA  
Tel.: +385 (0)1 4606-701, 4606-705  
Fax: +385 (0)1 4606-737  
E-mail: [industrija@hgk.hr](mailto:industrija@hgk.hr)

**HRVATSKA GOSPODARSKA KOMORA  
SREDIŠNJICA**

Rooseveltov trg 2  
p.p. 630  
HR-10000 ZAGREB  
Tel.: +385 (0)1 4561-555  
Fax: +385 (0)1 4828-380  
E-mail: [hgk@hgk.hr](mailto:hgk@hgk.hr)  
[www.hgk.hr](http://www.hgk.hr)

**CROATIAN CHAMBER OF ECONOMY  
HEADQUARTERS**

Rooseveltov trg 2  
p.p. 630  
HR-10000 ZAGREB, CROATIA  
Tel.: +385 (0)1 4561-555  
Fax: +385 (0)1 4828-380  
E-mail: [hgk@hgk.hr](mailto:hgk@hgk.hr)  
[www.hgk.hr](http://www.hgk.hr)