

## Dredging in Figures – 2008

*This review of the global dredging market focuses on the situation in 2008 and was published in October 2009.*

### Maritime Solutions for a Changing World

Dredging changes the world. Yet, at the same time, the industry itself is in constant transformation. Innovations and a solution-oriented approach have resulted in a substantial growth of the industry and a record of dredging projects executed in 2008.

This review analyses the development of the different industry drivers, the capacity figures for the main dredging equipment as well as the market turnovers specified in different regions and in types of projects.

Over the last year, the world has changed dramatically. The global economic outlook has significantly deteriorated although early signs of improvement are emerging. Dredging in Figures does not provide a specific outlook. However, for 2009, a stabilisation of the dredging market is expected due to the current economic downturn. Predictions for the period thereafter are difficult. It is uncertain to what extent a decline in dredging volumes is to be expected since, to a certain degree, the decline in private infrastructure investments seems to be compensated by government infrastructural projects.

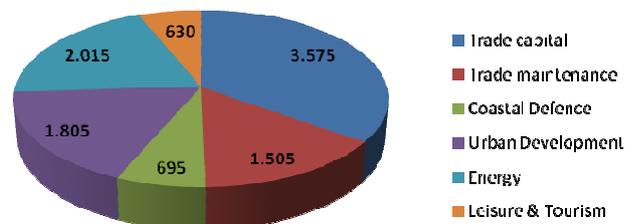
International institutions such as IMF, OECD, UNCTAD and many others, provide well-supported future outlooks on the drivers for the dredging industry. How to value these outlooks is a strategic choice for the players in the market.

### What drives Dredging?

Dredging is vital to social and economic development, in particular to the construction and maintenance of much of the infrastructure upon which our economic prosperity and social and environmental well-being depend. Dredging is a capital-intensive rather than people-intensive industry, and its impact is far larger than its direct employment and turnover. The world population depends heavily on dredging solutions for global trade, coastal defence, urban development, energy supplies and leisure/tourism.

The total turnover of global dredging contractors – private as well as state- or port-owned companies – is estimated at €10.225 mlio for 2008<sup>1</sup>. The graph below shows the composition of this turnover for 2008:

**Turnover global dredging market per driver (in mlio. € for 2008)**



### Environment

Dredging is 'building within nature'. This means that environmental activities and remedial dredging are an integrated part of every dredging project. In terms of turnover, this cannot be considered separately. Environmental engineering and monitoring are a requirement for every project. Remediation of past pollution is often related to port maintenance and development. Within each project, adverse environmental impacts are mitigated or compensated. Sometimes, creating additional nature or habitats is not only a compensation measure but enhances tourism and urban development. In the right hands and done properly, dredging creates a positive synergy between ecology and socio-economic development. As such, all turnover is strongly related to the environment.

<sup>1</sup> This figure relates to underwater excavation, transportation and placement of dredged material carried out in 2008. It does *not* include maritime construction such as breakwaters, offshore installations, harbour infrastructure, dams, dikes and other infrastructure in which dredging contractors are involved. However, within this figure, some € 1,225 mlio. relates to rock works that are an integrated part of land reclamations and coastal defence.

## Developments of drivers 2000–2008

### World Trade

Global trade has increased steadily between 2000 and 2008 regardless of business cycles in the global economy<sup>2</sup>. Container ships are getting larger and faster, putting increased demand on the capacity and efficiency of ports. Dredging solutions support ports in meeting this challenge by maintaining and deepening channels as well as supplying dredged material for building berths, quay walls and hinterland infrastructure. From 2000 to 2007, seaborne trade increased 34% measured in tonnes (*Source: UNCTAD 2008*). The turnover within the dredging industry as related to world trade has more than doubled during the period 2000 to 2008 from €2.000 mlio. to €5.000 mlio.

### Demography and Climate

#### Urban Development and Coastal Defence

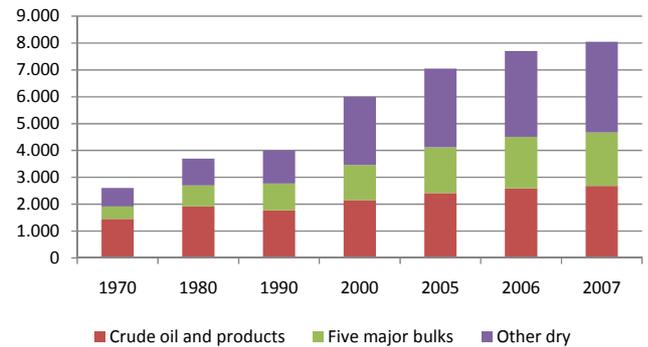
Population worldwide is growing, especially in coastal areas. According to the United Nations, three billion people are living along thousands of kilometres of coastal zones. In 2008, more people were living in urban than in rural areas. Eight out of the ten largest cities in the world are located along a coast. In those cities live people that need space and safety. And despite the economic downturn, they still had more money to invest and spend (*GDP source: IMF, 2009*). Along coast, people are confronted with dramatic fluctuations in atmospheric conditions and a steady rise of sea level (*source: IPCC 2007*). Although there are substantial annual fluctuations, it seems that the frequency and intensity of storms is increasing enlarging the need for effective and sustainable coastal defence.

Urban development has been a strong driver for the dredging industry for years and has increased since 2000 by 48% to €1.805 mlio. in 2008. Dredging for Coastal defence increased with 93% since 2000 to €695 mlio.

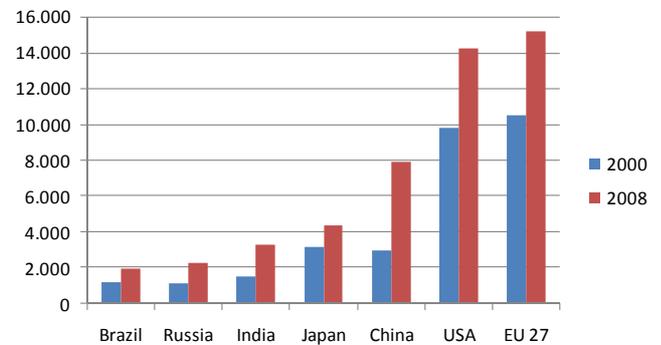
### Energy

Despite attempt to find alternative fuel sources, fossil fuels still dominate our energy needs. Offshore resources need dredging – to prepare the seabed and dig the trenches for pipelines, and then protect these pipelines by backfilling with sand, gravel and rock. Liquefied natural gas (LNG) creates a maritime infrastructure demand of its own. On the 'green' side, more and more wind farms are being placed at sea. Energy related dredging has increased some 340% since 2000 to € 2.015 mlio. in 2008.

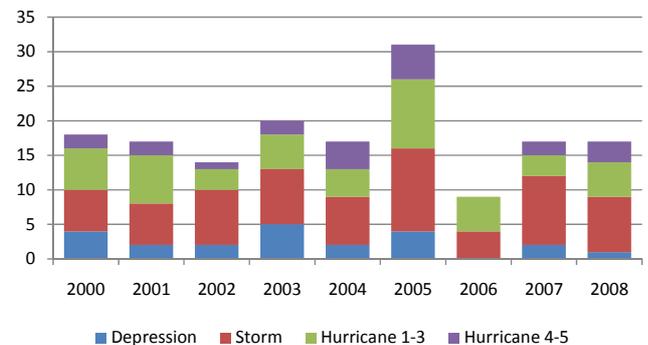
International seaborne trade 1970 - 2007  
(millions of tons)



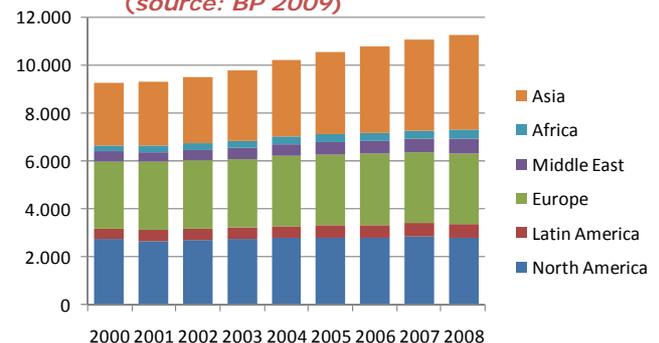
Gross domestic product 2000-2008  
(in PPP)



Storms US Atlantic Coast 2000-2008  
(source: Unisys Weather)



Primary Energy Consumption 2000 - 2008  
(source: BP 2009)



<sup>2</sup> In 2008, global trade increased with 2%. For 2009, a decline of 9% is predicted (source: WTO)

### *Tourism and Leisure*

From the Gulf of Mexico to the Mediterranean Sea to the Emirates to Australia's Gold Coast, tourism in or near water attracts millions of visitors annually. Water-related tourism has become an important source of national income for many countries. Marinas and cruise terminals, theme parks and resorts, dredging is needed more and more to keep the tourists coming.

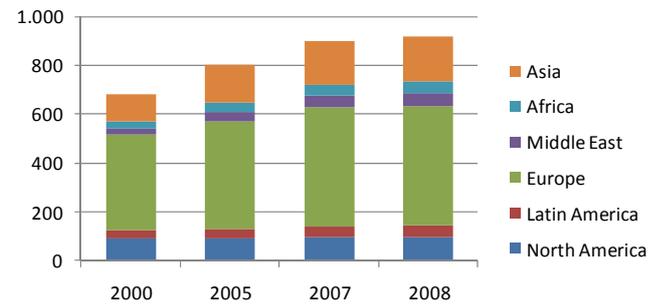
Dredging for recreation and tourist attractions has often been a spin-off of coastal defence activities such as beach replenishments. Nowadays, tourism is a driver for dredging in its own right with some €630 mlio. turnover in 2008.

### *Dredging has grown faster than its drivers*

While all drivers for dredging have been expanding since 2000, most of them have grown at a moderate rate. Yet in the dredging industry itself turnover has more than doubled and capacity is fully used. Why has dredging grown faster than its drivers? The answer is innovation and sustainability. Modern dredgers can dig deeper and retrieve material from greater distances. Dredging vessels are being built ever larger, with more technology and high-tech systems. People are well trained and knowledge transfers from one project to another builds the experience base.

This innovative spirit in the industry has created new markets and contributes to sustainable development.

**International Tourist Arrivals 2000 - 2008**  
(source: UNWTO 2009)



### Development capacity 2000–2008

Dredging is carried out by specially developed equipment that varies widely, comes in many sizes and types, and includes mainly water-based and some land-based machines. Dredging equipment, classified according to the methods of excavation and operation, can be grouped into the following main categories:

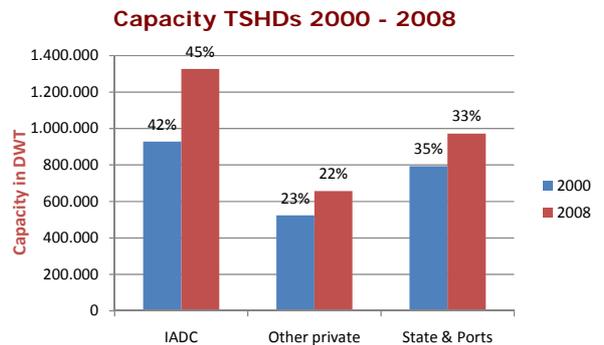
- mechanical dredgers are well suited to removing hard-packed material or debris and to working in confined areas.
- hydraulic dredgers add large amounts of process water and thus change the original structure of sediments; they “slurry the sediment”. Transport methods associated with hydraulic dredgers are pipeline and hopper transport. In some cases, hydraulic dredgers may pump the materials into barges for transport.

The selection of dredging equipment for a particular project will depend upon a combination of factors including the type of physical environment, the method of placement, the distance to the disposal site as well as the nature, quantity and quality of the material to be dredged.

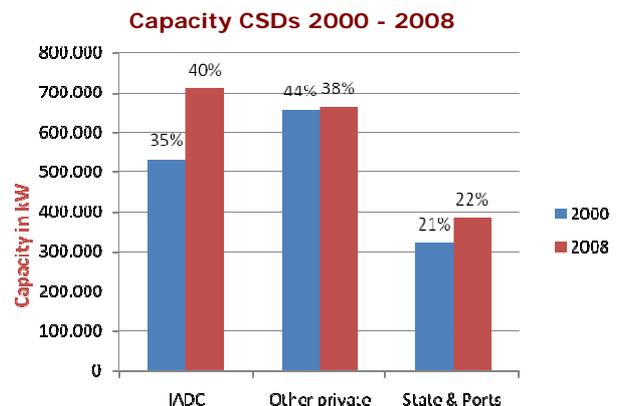
Analysing the developments in capacity of dredging equipment is a difficult task. Many dredging vessels are inland vessels and may not be mentioned in any ship register. Furthermore, comparing the capacity of a backhoe with a trailing suction hopper dredger or a 20-year old dredger with a high-tech newly built vessel is impossible. Consequently, this analysis cannot be based on complete records and instead focuses on the main types of equipment: trailing suction hopper dredgers (TSHD), cutter suction dredgers (CSD) and backhoe/grab/dipper dredgers. For 2008, 1,206 vessels have been identified of which 264 backhoes, 433 CSDs and 509 TSHDs.

For TSHDs capacity is measured in deadweight tonnage (carrying capacity), for CSDs and backhoes in total installed diesel power in kW. Vessels are further categorised by type of owner: state- and/or port-owned plant, private dredging contractors that are members of IADC, and other private dredging contractors, whether operating in free or in closed markets such as the USA.

The total capacity of TSHDs has increased with 32% since 2000 to 2.95 mlio Dw tonnes. The share of IADC member companies in TSHD capacity increased from 42% to 45%. Most of this increase is due to medium, large and jumbo high-tech vessels. The increase in state- and/or ports-owned vessels is substantially related to China.

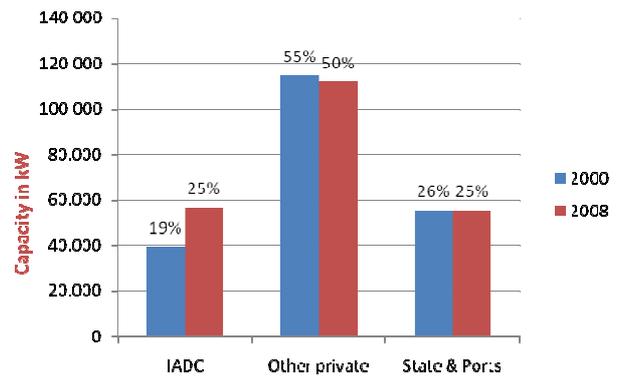


The total capacity of CSDs increased with 17% since 2000 to 1.75 mlio installed kW. Some new, larger sea-going CSDs have replaced older cutters. IADC members’ share went up to 40%. The growth of state- and/or port-owned CSDs since 2000 is nearly all related to China.



### Capacity Backhoe/Grab/Dipper 2000 - 2008

The total capacity of backhoe/grab/dipper dredgers has increased with 7% since 2000 to 224,000 total installed kW. IADC members' capacity went up to a share of 25%.



### Top-10 players – ranked according to capacity per category

In all categories of equipment, the four large Belgian and Dutch contractors, as well as state-owned CHEC from China, are well represented.

In the categories CSD and TSHD, the top-ten players represent the majority of global capacity.

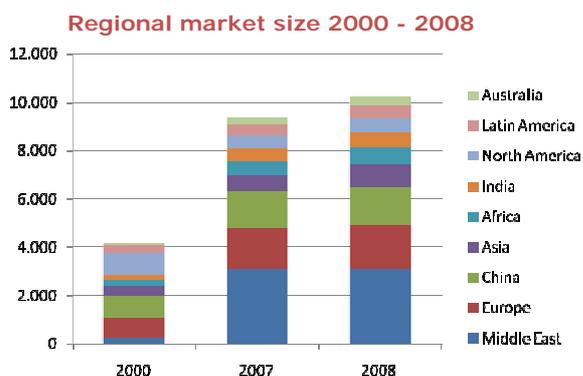
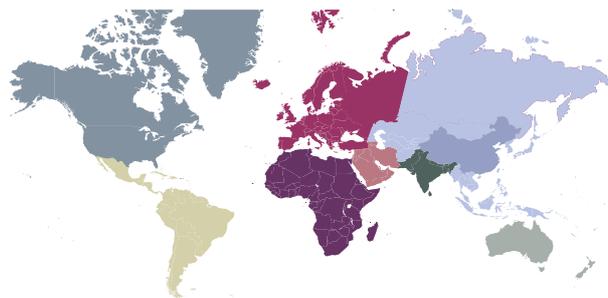
Owners Backhoe, Grab and Dipper Dredgers		
1	Royal Boskalis Westminster (Netherlands)	11%
2	Great Lakes Dredge & Dock (USA)	6%
3	CHEC (China)	5%
4	Jan de Nul NV (Belgium)	4%
4	DEME NV (Belgium)	4%
4	Van Oord NV (Netherlands)	4%
7	GIE Dragages - Ports	3%
7	Weeks Marine Inc (USA)	3%
9	Inai Kiara (Malaysia)	2%
9	UDL Marine Assets	2%
% of global capacity - top 10		44%

Owners Cutter Suction Dredgers		
1	Royal Boskalis Westminster (Netherlands)	8%
2	CHEC (China)	7%
3	Van Oord NV (Netherlands)	6%
3	DEME NV (Belgium)	6%
3	Jan de Nul NV (Belgium)	6%
6	Great Lakes Dredge & Dock (USA)	5%
6	National Marine Dredging Company (UAE)	5%
8	Suez Canal Authority (Egypt)	4%
8	Penta Ocean Construction (Japan)	4%
#	Mike Hooks Inc (USA)	3%
% of global capacity - top 10		55%

Owners Trailing Suction Hopper Dredgers		
1	CHEC (China)	14%
2	Van Oord NV (Netherlands)	11%
3	Jan de Nul NV (Belgium)	9%
3	Royal Boskalis Westminster (Netherlands)	9%
3	DEME NV (Belgium)	9%
6	Dredging Corporation of India (India)	3%
7	Indonesian State	2%
7	Hyundai E&C (Korea)	2%
7	Inai Kiara (Malaysia)	2%
7	Great Lakes Dredge & Dock (USA)	2%
% of global capacity - top 10		63%

## Regional market size 2000-2008

In 2008, the Middle East, Europe and China were the largest dredging markets representing 63% of global turnover. For this review, Europe includes Turkey, Western Russia and the Black Sea countries. Eastern Russia, Caspian Sea countries, Japan and SE Asia are included in Asia.

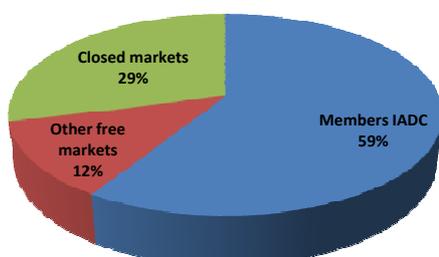


**in mln. €**

	free markets	closed markets	total 2008
Middle East	3,035	50	3,085
Europe	1,770	40	1,810
China	80	1,515	1,595
Asia	450	455	905
Africa	600	100	700
India	435	210	645
North America	15	560	575
Latin America	525	25	550
Australia	350	10	360
<b>total<sup>1)</sup></b>	<b>7,260</b>	<b>2,965</b>	<b>10,225</b>

<sup>1)</sup> of which stone work € 1,225

**Dredging market shares 2008**  
(% of total € 10.225 mlno. turnover)



Since 2000, the global dredging turnover more than doubled. Compared to 2007, turnover in 2008 increased by 9%. Not all regional markets have grown at the same pace. Compared to 2000, the Middle East saw a boost by a factor 14. The Chinese market is now some 70% larger than in 2000, whereas the Australian market increased by 260% since 2000. Dredging turnover in Europe went up near the global average of 150%. The only markets in decline since 2000 is the USA, although it picked up slightly in 2008. Asia, Africa, Latin America and Australia show a substantial growth compared with 2007.

The volume of dredging executed by state- and/or port-owned companies as well as dredging projects closed to international tenders is still substantial, with China as no. 1 and the USA no. 2. In China, some projects are open for international tenders. The USA market is effectively closed by the Jones Act, which makes it impossible for a non-USA owned and controlled contractor to tender. In India, state-owned DCI has a preferred position in tendering but foreign companies may tender. Globally, however, the market share of these closed markets dropped from 42% in 2000 to 29% in 2008.

The market share of private contractors that are members of IADC increased from 43% (2000) to 59% in 2008. When looking only to markets with free access, IADC members represent a total of 83% market share (2000: 75%).

### *Quantity of dredged material*

Dredging around the world in financial terms such as turnover is quantifiable. However, the total amount of m<sup>3</sup> dredged annually has not been estimated. It makes little sense to do so since dredging a cubic metre of silt is not the same as a cubic metre of rock. The total amount of dredged material annually depends heavily on the specific projects and circumstances (soil, accessibility, sailing distances etc.) which have a large impact on production.

## Definitions and methodology

This review relates to the annual turnover estimated for 2008. 'Carried out in 2008' therefore does not necessarily mean 'contract awarded in 2008', nor that payment was received in 2008. It means only work that was actually performed in 2008. For projects only partially performed in 2008 (e.g. a project started 1-1-2007 and finalised 30-6-2008), the value of the part actually executed in 2008 has been estimated.

Dredging projects in inland waterways – as far as known – are included in the survey as well as stone protection works for quay walls, coastal protection (but excluding stone dumping through FFP vessels and stone-dumpers). Only 'wet work' has been calculated in the figures so no land-based 'dry' engineering works are included. Ecological measures and remedial dredging as such are integrated in the other categories.

### *Types of projects*

#### Trade:

- harbour extensions (excl. offshore crude oil terminals and LNG terminals, excluding marinas and cruise terminals)
- navigation channels
- maintenance dredging

#### Coastal defense:

- beach replenishment
- dike building/raising and flood defence works (wet work only)
- other shore protection measures

#### Urban development:

- land reclamation for
  - industrial infrastructure (oil refineries, chemical plants, waste treatment plants, waste disposal sites, wastewater treatment plants, water desalination plants, power plants etc.)
  - trade and service infrastructure (trade fairs, business parks, conference centres etc.)
  - transport infrastructure (airports, roads, parking facilities, rail projects etc.)
  - housing driven by demographical pressure
- immersed tunnels, dams and bridges
- outfalls
- controlled storage building for contaminated materials

#### Energy:

- offshore crude oil terminals and LNG terminals
- cables and pipelines (incl. backfilling and protection)
- dredging related to oil drilling facilities (e.g. platforms, glory holes)
- other offshore installations (e.g. wind farms)

#### Tourism:

- recreation (theme parks, recreation piers/wharfs, shopping malls)
- marinas and cruise terminals
- land reclamation for hotels, holiday resorts, beaches etc.

### *Methodology*

**Dredging in Figures** has been carefully compiled by a Delphi survey amongst IADC members, analysis of company reports and other (public) sources. All information has been verified to the best of our ability, but we cannot be held responsible for any inaccuracies. The review does not necessarily reflect the opinions of individual IADC members. Please contact IADC if you wish to reproduce any or all information in this review in electronically or in any other form.

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*International Association of Dredging Companies (IADC) is the global umbrella organisation for contractors in the private dredging industry. As such IADC is dedicated to promoting not only the skills, integrity and reliability of its members, but also the dredging industry in general. The information presented here is part of an ongoing effort to support clients and others to understand the fundamental importance of dredging and maritime construction.*