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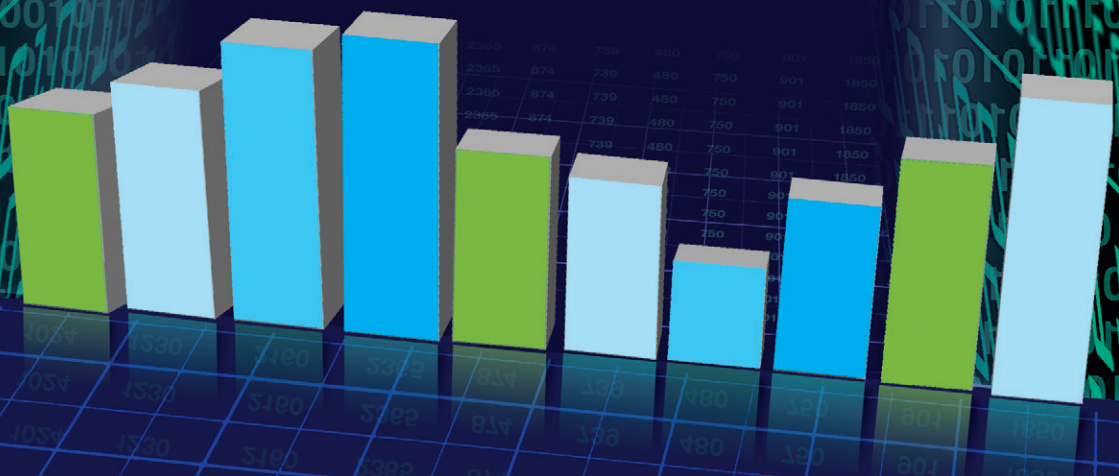
THE 2011 MECHANICAL DRIVE ORDER SURVEY



Power Generation • Marine Propulsion • Oil & Gas • Rail Traction

MECHANICAL DRIVE RECIPROCATING ENGINE ORDERS, January – December 2010																		
Output Range (MW)	Units Ordered	Total Engine Output (MW)	Speed Range (r/min)			Fuel		Western Europe	Eastern Europe, Russia & CIS	Middle East	Far East	Southeast Asia & Australia	Central Asia	North Africa	Central, West, East & South Africa	North America	Central America & Caribbean	South America
			300 to 600	720 to 1000	Above 1000	Liquid Fuel	Natural Gas											
0.5 to 1.0	1968	1249	0	0	1968	1930	38	494	0	30	172	109	1	0	8	1140	7	7
1.01 to 2.0	1952	2942	0	0	1952	1573	379	133	0	4	111	10	0	0	1	1674	0	19
2.01 to 3.5	43	102	0	0	43	30	13	17	0	0	13	0	0	0	0	13	0	0
3.51 to 5.0	13	47	0	1	12	6	7	0	0	2	0	0	0	0	0	9	0	2
5.01 to 7.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.51 & above	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	**3976**	**4340**	**0**	**1**	**3975**	**3539**	**437**	**644**	**0**	**36**	**296**	**119**	**1**	**0**	**9**	**2836**	**7**	**28**

2011 Mechanical Drive Order Survey

A review of reciprocating engine, gas turbine and steam turbine orders for mechanical drive applications

Diesel & Gas Turbine Worldwide's Mechanical Drive Order Survey is the third of three surveys designed to provide details on the markets of larger reciprocating engines, steam turbines and gas turbines used in power generation, marine propulsion and mechanical drive applications.

We divide the data into three reports in order to provide a more in-depth look at each market segment. The Mechanical Drive Order Survey is devoted to engine orders for mechanical drive applications including pumps, compressors, oil exploration machinery, rail and other industrial applications. The Marine Propulsion Order Survey, which appeared in the June issue, examines mechanical drive, auxiliary and diesel-electric marine propulsions systems. The Power Generation Order Survey, which appeared in the May issue, examines reciprocation engines, steam turbines and gas turbines for power generation service.

A pdf of each survey is available at www.dieselgastubine.com.

Procedures

The Mechanical Drive Order Survey includes drivers beginning at 500 kW (0.5 MW). New orders are broken into reciprocating engine, gas turbine and steam turbine orders.

Fuel types are simplified to reflect only liquid versus gaseous fuels. Liquid fuel, as reported in this survey, can be any form of diesel oil.

All data found in the survey was provided by participating OEMs. An accompanying table identifies those companies that participated in the 2011 survey. Every effort is made to ensure that this survey is as complete and comprehensive as possible. It would not have the level of detail it contains without the generous contributions of the participating companies.

It is important to note that the data in this survey does not represent units shipped, but only the total orders received during calendar-year 2010.

For reference, the geographic breakdown that was presented to the participating OEMs along with the survey forms is included in this report.

Overview

Signs of recovery in the oil and gas sector are reflected in this year's survey. Total orders in 2010 were up 10% compared to 2009.

The Energy Information Administration (EIA) reported that world crude oil and liquid fuels consumption grew to a record high 86.7 million bbl/d in 2010. In its July Short Term Energy Outlook report, the EIA reported that it expects that world consumption will continue to grow by 1.4 million bbl/d in 2011 and by 1.6 million bbl/d in 2012, resulting in total world consumption of 89.7 million bbl/d in 2012. Countries outside the OECD will make up almost all of the growth in consumption over the next two years, with the largest increases coming from China, Brazil and the Middle East. Among OECD countries, the EIA expects that consumption will increase in the United States, Canada, Mexico and South Korea over the next two years, offsetting declines in OECD Europe. Consumption in Japan is forecast to increase slightly in 2011 but then fall in 2012 as power plants recover from the impacts of the earthquake and tsunami.

Total U.S. consumption of liquid fuels in 2010 grew by 380 000 bbl/d, or 2%, the fastest rate of growth since 2004. According to the EIA report, distillate fuel oil accounted for more than 40% of that increase, growing by 4.5%.

In contrast to 2010, projected total U.S. liquid fuels consumption in 2011 by just 30 000 bbl/d, down sharply from the 150 000 bbl/d projected in the EIA's previous Short Term Energy Outlook report. In 2012, total U.S. liquid fuels consumption is forecast to increase by 140 000 bbl/d (0.7%) to 19.3 million bbl/d with motor gasoline consumption rising by 60 000 bbl/d (0.7%) and distillate fuel consumption increasing by 70 000 bbl/d (1.7%) as manufacturing activity continues to register strong growth.

The EIA expects that total natural

MECHANICAL DRIVE GAS TURBINE ORDERS, January – December 2010

Output Range (MW)	Units Ordered	Total Engine Output (MW)	Fuel		Western Europe	Eastern Europe, Russia & CIS	Middle East	Far East	Southeast Asia & Australia	Central Asia	North Africa	Central, West, East & South Africa	North America	Central America & Caribbean	South America
			Liquid Fuel	Natural Gas											
1.0 to 2.0	3	5	3	0	0	0	0	3	0	0	0	0	0	0	0
2.01 to 3.5	6	20	6	0	0	0	0	5	0	0	0	1	0	0	0
3.51 to 5.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.01 to 7.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.51 to 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.01 to 15	1	12	0	1	0	0	0	0	0	0	1	0	0	0	0
15.01 to 20	34	544	0	34	0	34	0	0	0	0	0	0	0	0	0
20.01 to 30	56	1423	0	56	5	20	22	5	0	2	0	2	0	0	0
30.01 to 60	47	1592	0	47	3	2	9	0	26	1	6	0	0	0	0
60.01 to 120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120.01 to 180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180.01 & above	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	**147**	**3596**	**9**	**138**	**8**	**56**	**31**	**13**	**26**	**3**	**7**	**3**	**0**	**0**	**0**

gas consumption will grow by 2.0% to 1.9 billion m^3/d in 2011. Forecast industrial and electric power consumption are expected to rise in 2011 by 3.3% to 530 million m^3/d and 2.1% to 583 million m^3/d, respectively.

Increased consumption is good for production. The EIA projects that non-OPEC crude oil and liquid fuels production will increase by 540 000 bbl/d in 2011 and by 740 000 bbl/d in 2012. The greatest increases in non-OPEC oil production during 2011, according to the EIA, occur in Canada (170 000 bbl/d), China (140 000 bbl/d), the United States (140 000 bbl/d), Brazil (120 000 bbl/d), and Colombia (120 000 bbl/d). The EIA has lowered the rate of production declines in the North Sea and Europe compared to its last Short Term Energy Outlook report. Increased taxes on production, particularly in the United Kingdom, are now expected to have less of an effect on total production. At the same time, the EIA now expects that Azerbaijan's production will be lower compared to its previous Outlook Report, as continued problems with the production in the Azeri-Chirag-Guneshli field last longer than initially anticipated. In Russia, lack of reform of the tax regime likely will dampen any increase in oil production.

Acquisition activity in the rail segment may show increased results in next year's survey.

In May, Wärtsilä entered the rail market through a joint venture with Transmashholding (TMH) in Russia.

The joint venture broadens Wärtsilä's business into the rail market and gives the company a stronger industrial foothold in Russia. The agreement calls for TMH to manufacture modern and multipurpose diesel engines in Russia. The engines, including a new version of the Wärtsilä 20 engine, will be used in shunter locomotives and for various marine and power applications. The two companies will jointly engineer the railway application. Wärtsilä and TMH will also evaluate broadening the activities of the joint venture to include the development and manufacturing of other diesel engine models in the future.

Wärtsilä and TMH will set up a 50/50 holding company to establish and operate a new engine factory in Penza, Russia, for assembling and testing engines, and for the production of certain larger engine components. Annual production is estimated to reach 250 to 300 engines and will serve the rail, marine and power plant markets. A large share of the production will be targeted toward the Russian market, with a smaller share likely to be exported outside Russia.

In June, Caterpillar, through its subsidiary Progress Rail Services, strengthened its presence in the rail market by acquiring Electro-Motive Diesel (see *D&GTW*, July 2010, p. 14). Analysts report that Caterpillar expects 450 to 500 U.S. locomotive shipments in 2011, roughly twice the amount in 2010 but still well below what analysts call the norm — 800 units.

The global industrial pump market value declined slightly since last year's report. Analysts had quantified the

MECHANICAL DRIVE STEAM TURBINES ORDERS, January – December 2010

Output Range (MW)	Units Ordered	Total Engine Output (MW)	Steam Turbine Types					Western Europe	Eastern Europe, Russia & CIS	Middle East	Far East	Southeast Asia & Australia	Central Asia	North Africa	Central, West, East & South Africa	North America	Central America & Caribbean	South America
			Condensing	Non-condensing	Reheat	Extraction	Induction											
0.0 to 1.0	222	65	24	198	0	0	0	33	12	38	30	19	21	1	4	45	11	8
1.01 to 5.0	121	228	92	29	0	0	0	24	4	39	23	0	11	0	1	0	12	7
5.01 to 10	9	71	3	3	0	2	1	0	1	3	2	1	2	0	0	0	0	0
10.01 to 30	16	195	7	1	0	5	1	0	0	2	3	1	3	0	0	0	0	3
30.01 to 60	15	655	10	2	0	3	0	0	0	4	8	0	1	0	0	2	0	0
60.01 to 120	1	84	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
120.01 & above	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	**384**	**1298**	**136**	**233**	**0**	**11**	**2**	**57**	**17**	**87**	**66**	**21**	**38**	**1**	**5**	**47**	**23**	**18**

Combined Regional Totals — All Driver Types January – December 2010

Western Europe	709
Eastern Europe, Russia & CIS	73
Middle East	154
Far East	375
Southeast Asia & Australia	166
Central Asia	42
North Africa	8
Central, West, East & South Africa	17
North America	2883
Central America & Caribbean	30
South America	46

2009 market (reflected in the 2010 Mechanical Drive Order Survey) at US$36 billion. That number fell to its current estimated value of slightly less than US$35 billion. Sales in Asia account for 43% of the world industrial pump total.

Growth is anticipated in the industrial pump market in 2011, aided by China steadily gaining domestic capability to produce more types of industrial pumps. Good news for the manufacturers of the prime movers required to operate them.

Reciprocating Engines

The number of reciprocating engines ordered in 2010 totaled 3976 units, a 15% increase compared to last year's survey. Orders were almost evenly split between the output ranges of 0.50 to 1.00 MW (1968 units) and 1.01 to 2.00 MW (1952 units). Like last year, the 0.50 to 1.00 MW output range saw the most activity, accounting for 49% of the total recip orders, but only by 16 engines. Engines rated 1.01 to 2.00 MW came in a close second.

Engine operating speed continued the trends reflected in the past few surveys, with all but one order falling above 1000 r/min.

Liquid-fueled engines once again received the most orders (89%).

The geographic breakdown almost exactly mirrors 2009's breakdown. North America once again led with 71% of the total recip orders. Second was Western Europe (16%), followed by the Far East (7%).

Gas Turbines

Gas turbine orders were down 1% compared to the 2010 survey (2009 data). Total gas turbines ordered was 147. Units within the output range of 20.01 to 30.00 MW received the

Reciprocating Engine Manufacturers Participating And Reporting Orders In This Mechanical Drive Survey:

- Caterpillar Inc.
- Cummins Inc.
- Electro-Motive Diesel Inc.
- GE Energy – Waukesha Gas Engines
- Tognum AG / MTU Friedichshafen

Gas Turbine Manufacturers Participating And Reporting Orders In This Mechanical Drive Survey:

- GE Oil & Gas
- MAN Diesel & Turbo
- Niigata Power Systems
- Rolls-Royce
- NPO Saturn
- Vericor Power Systems LLC
- Zorya-Mashproekt

Steam Turbine Manufacturers Participating And Reporting Orders In This Mechanical Drive Survey:

- Dresser-Rand
- GE Oil & Gas
- Hyundai Heavy Industries Ltd.
- MAN Diesel & Turbo
- Mitsubishi Heavy Industries Ltd.

Country Information For Regions/Regional Codes *D&GTW* Annual Market Surveys

Western Europe (Without Eastern Europe)
Andorra
Austria
Belgium
Denmark
Finland
France
Germany
Greece
Iceland
Liechtenstein
Luxembourg
Italy
Ireland
Netherlands
Malta
Norway
Portugal
San Marino
Slovenia
Spain
Sweden
Switzerland
United Kingdom

Eastern Europe, Russia & CIS
Albania
Armenia
Azerbaijan
Belarus
Bosnia and Herzegovina
Bulgaria
Croatia
Czech Republic
Estonia
Georgia
Hungary
Kazakhstan
Kyrgyzstan
Latvia
Lithuania
Moldova
Poland
Republic of Macedonia
Romania
Russia
Serbia
Slovac Republic
Tajikistan
Turkmenistan
Ukraine
Uzbekistan

Middle East
Bahrain
Cyprus
Egypt
Iran
Iraq
Israel
Jordan
Kuwait
Lebanon
Oman
Qatar
Saudi Arabia
Syria
Turkey
United Arab Emirates
Yemen

Far East
China
Hong Kong
Japan
Mongolia
North Korea
South Korea
Taiwan

Southeast Asia & Australia
Australia
Brunei
Burma
Cambodia
Fiji Islands
Indonesia
Kiribati
Laos
Malaysia
Marshall Islands
Micronesia
Palau
Papua New Guinea
Philippines
Samoa
Singapore
Solomon Islands
Tahiti
Tonga
Thailand
Tuvalu
Vanuatu
Vietnam

Central Asia
Afghanistan
Bangladesh
India
Maldives Islands
Nepal
Pakistan
Sri Lanka

North Africa
Algeria
Libya
Morocco
Tunisia

Central, West, East & South Africa
Angola
Benin
Botswana
Burkina Faso
Burundi
Cameroon
Cape Verde
Cen. African Rep.
Chad
Comoros
Congo
Cote d'Ivoire
Djibouti
Equatorial Guinea
Eritrea
Ethiopia
Gabon
Gambia
Ghana
Guinea
Guinea Bissau
Ivory Coast
Kenya
Lesotho
Liberia
Madagascar
Malawi
Mali
Mauritania
Mauritius
Mozambique
Namibia
Niger
Nigeria
Rwanda
Senegal
Seychelles
Sierra Leone
Somalia
South Africa
Sudan
Swaziland
Tanzania
Togo
Uganda
Zaire
Zambia
Zimbabwe

North America
Canada
U.S.A.

Central America & Caribbean
Bahamas
Bermuda
Belize
Costa Rica
Cuba
Dominica
Domin. Republic
El Salvador
Guatemala
Haiti
Honduras
Jamaica
Mexico
Nicaragua
Panama
Puerto Rico
Virgin Islands
West Indies

South America
Argentina
Bolivia
Brazil
Chile
Colombia
Ecuador
Guyana
Paraguay
Peru
Surinam
Uruguay
Venezuela

most orders (38%) followed by units rated 30.01 to 60.00 MW (32%).

Eastern Europe, Russia and CIS once again proved to be the top geographic location for gas turbines in mechanical drive applications, receiving 38% of the orders. Rounding out the top three geographic locations is the Middle East (21%) and Southeast Asia and Australia (18%).

Steam Turbines

Steam turbine orders fell nearly 21% from last year's survey. Total steam units ordered in 2010 was 384, most falling within the 0.0 to 1.0 MW range (57%).

Noncondensing steam turbines received the most demand, accounting for 61% of the total steam turbines ordered. Due to varying classifications by OEMs, there is a slight difference between the totals reflected within the accompanying steam turbine orders chart. In some cases, extraction admission condensing turbines were counted as "extraction" and "induction" respectively.

The Middle East claimed the top geographic location with 23% of the total units ordered. The Far East accounted for 17%, followed by Western Europe, which totaled 15%.

Annual Surveys

On behalf of *Diesel & Gas Turbine Worldwide*, thank you to all contributors for your continued participation in this annual survey process. It is our hope that the three surveys combined will provide an accurate snapshot of the entire large engine landscape, with fine-tuned detail provided for three market segments through each individual report — power generation, marine propulsion and mechanical drive. Electronic versions of past surveys are available at our website: www.dieselgasturbine.com. Questions, comments and suggestions should be directed to bhaight@dieselpub.com.

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