Safety benchmarking in the oil and gas industry in Latin America and the Caribbean

2012 Statistics for ARPEL Member Companies

REGIONAL ASSOCIATION OF OIL, GAS AND BIOFUELS SECTOR COMPANIES IN LATIN AMERICA AND THE CARIBBEAN

ARPEL REPORT

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ARPEL, July 2013

ARPEL
Report on Safety Benchmarking in the Oil and Industry for Latin America and the Caribbean - 2012 Statistics for ARPEL Member Companies
ARPEL OHS Report Nº 30-2013
July 2013

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SBPT – CASYSIA (Safety Benchmarking Project Team – ARPEL EHS Committee)

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1. EXECUTIVE SUMMARY

This report is a compilation of safety statistics of ARPEL Member Companies. It analyzes four reactive indicators (total incidents, gravity, frequency of incidents with lost work days and fatalities) and two proactive indicators (safety training intensity and task planned observations), broken down by business line (E&P, refining, pipelines, distribution and others) and by category (company and contractors), and also including historical data since 2000.

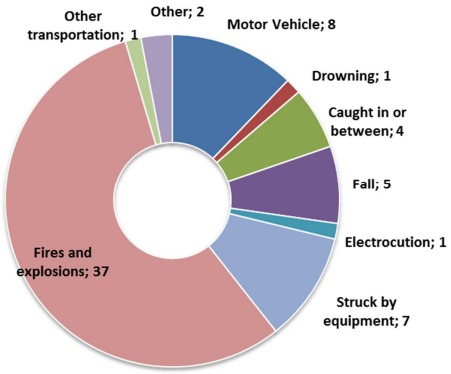
Scope:
Nineteen companies shared their data for 2012, with a total coverage of 907,451 employees and 2,105 million hours worked.

Reactive indicators:
The total incidents' rate recorded a decrease for the second consecutive year, falling from 3.61 incidents per million hours worked in 2010, to 3.29 in 2011 and to 2.15 in 2012; the frequency rate of incidents with lost workdays is ranked in the lowest value in the last ten years (0.91 incidents per million hours worked) and, finally, the rate of severity showed a slight decline (from 66.9 in 2011 to 64.4 in 2012).

Proactive indicators:
Both proactive indicators continue to show a growing trend. For the year 2012, 4.59 task planned observations per employee were registered and the safety training hours represented 0.42% of the total man hours worked.

Indicator	2011	2012	var
Total incidents rate	3.29	2.15	-35%
Gravity rate	66.93	64.43	-4%
Incidents w/LWD rate	2.22	0.91	-59%
Fatalities rate	0.028	0.031	13%

Fatalities:
here were 66 fatalities during 2012 representing a rate of 0.031 fatalities per million man-hours worked. The value is somewhat higher than that recorded in 2011 (0.028) but with the particularity that the number of incidents recorded was lower, thus increasing the number of fatalities per incident.
The main cause of fatalities in the year was "fires and explosions" with 56% of the total. Fires and explosions is also the main historical cause of mortality since ARPEL began to keep records in 2001 (136 cases; 20% of the total).



Incidents feedback:
In order to prevent and reduce fatal and high potential incidents that happen every year in the industry, ARPEL has opened a space for the exchange of information, only for members in its web page (www.arpel.org), in which you can see and share in detail the conditions, causes, failures, and lessons learned from safety incidents that have been recorded in the industry from 2010 to date.

2. INDICATORS (methodological note)

This report collects four reactive indicators and two proactive indicators, which are detailed below:

2.1. Reactive

1. $\textbf{Total incidents' rate} = \frac{\textbf{Total recordable cases (injuries+illnesses+fatalities)}}{\textbf{Hours worked (in millions)}}$
2. $\textbf{Incidents gravity rate} = \frac{\textbf{Number of days away from work}}{\textbf{Hours worked (in millions)}}$
3. $\textbf{Incidents' frequency rate with lost workdays} = \frac{\textbf{cases with lost workdays}}{\textbf{Hours worked (in millions)}}$
4. $\textbf{Fatalities' rate} = \frac{\textbf{Number of fatalities}}{\textbf{Hours worked (in millions)}}$

2.2. Proactive

5. $\textbf{TPO Indicator} = \frac{\textbf{Number of Task Planned Observations (TPO) recorded}}{\textbf{Average number of workers}}$
6. $\textbf{Safety Training Intensity} = \frac{\textbf{Total number of safety trining hours}}{\textbf{Hours worked (in millions)}} * \textbf{100}$

For more information on the indicators or definitions, please refer to the User Manual (6th edition 2012) or the glossary provided at the end of this Report.

Not all companies report data for the calculation of all the rates, either because they do not have the information in the required breakdown, or simply because the requested information does not apply to the company in question. The indicators are calculated with the data reported for each particular indicator, so that the denominators vary depending on the number of companies that have reported their data correctly for each particular indicator.

Overall data of the companies is shown, broken down by category (company/contractors), in addition to a breakdown for onshore and offshore E&P. Proactive indicators are calculated only for company employees.

3. SCOPE OF THE INFORMATION

Nineteen ARPEL member companies shared their 2012 safety data for the development of this report, as shown in the following table.

Companies			
ANCAP	EQUIÓN	PETROAMAZONAS EP	RECOPE
CHEVRON	HOCOL	PETROBRAS	REFIDOMSA
ECOPETROL	OCENSA	PETROPERÚ	REPSOL
ENAP	PCJ	PETROTRIN	STAATSOLIE
EP PETROECUADOR	PEMEX	PLUSPETROL	

The following table shows the total number of employees and man-hours reported.

As can be seen, the level of 900,000 employees and 2,000 million hours worked was again surpassed, thus achieving a high representativeness of the oil and gas industry in Latin America and the Caribbean.

		Company		Contractors		Totals	
Function	# Companies	Employees	M/H	Employees	M/H	Employees	M/H
E&P	13	101,840	217,667	261,263	697,413	363,103	915,080
Refining	13	70,971	168,234	43,750	106,496	114,721	274,730
Pipelines	8	19,749	42,238	33,936	85,163	53,685	127,401
Transp. - maritime	3	11,192	20,406	456	1,272	11,648	21,678
Distribution	8	19,378	42,527	15,692	30,438	35,070	72,965
Other	10	64,460	141,217	264,764	552,159	329,224	693,376
Total	**19**	**287,590**	**632,289**	**619,861**	**1,472,941**	**907,451**	**2,105,230**

M/H: Man Hours worked

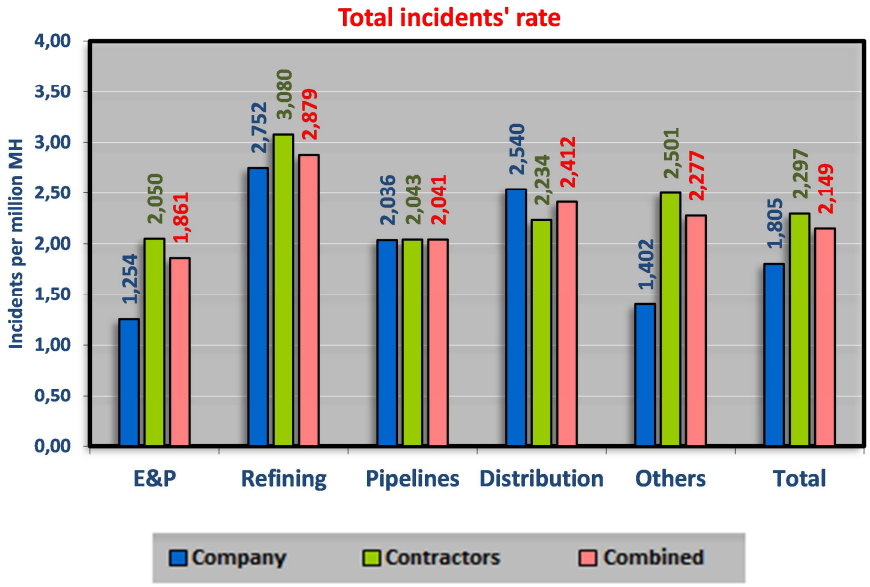
Chapter 4 includes an analysis of the reactive indicators (total incidents, gravity, incidents with lost work days and fatalities) and the proactive indicators (task planned observations and safety training intensity) in a comprehensive manner, with a section for each function of the industry under consideration (E&P, refining, pipelines, distribution and others). The data on maritime transportation are considered only in the total as there are not enough companies for an exclusive benchmarking of this function.

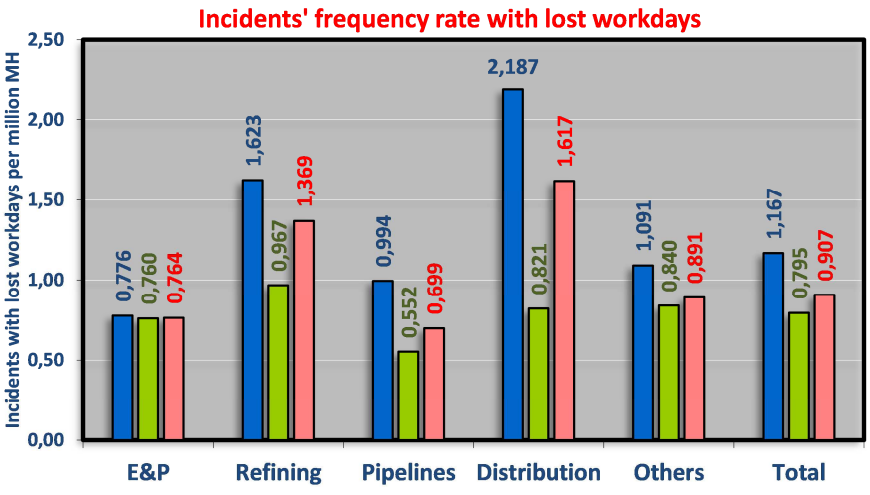
Chapter 5 includes a more in depth analysis of the causes of fatalities; chapter 6 provides a glossary; chapter 7 contains the calculation tables of the indicators with the values for 2012 in addition to the historical series of indicators; and chapter 8 contains some references and bibliography used in the development of the Manual and this report.

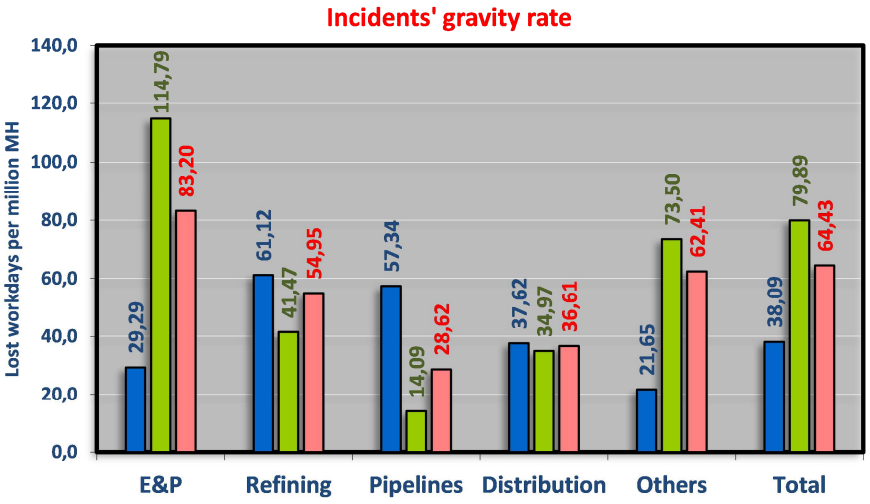
4. RESULTS

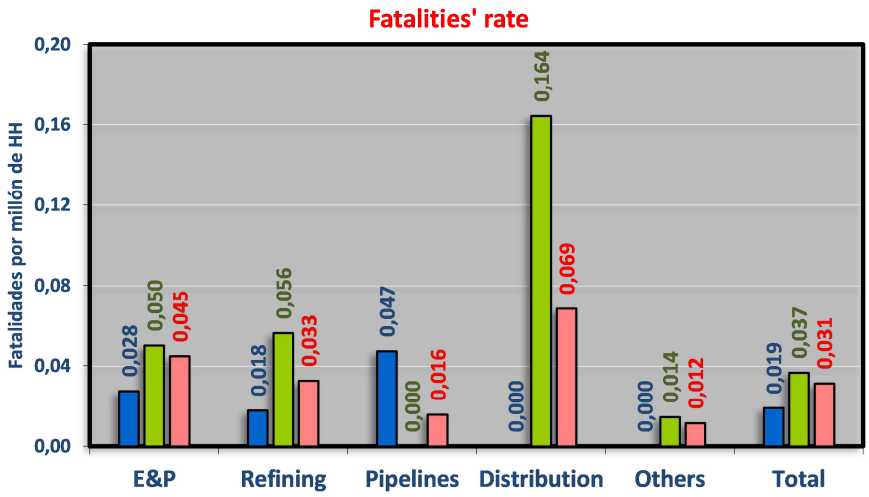
4.1. Overall Results

Below are the 2012 overall results for the four reactive indicators by function and then by company. Refining was the activity with more incidents per million hours worked (2.88), E&P the one with the highest number of days lost -gravity - (83.20), and Distribution the one with the highest frequency of incidents with lost days (1.62) and fatalities (0.069).

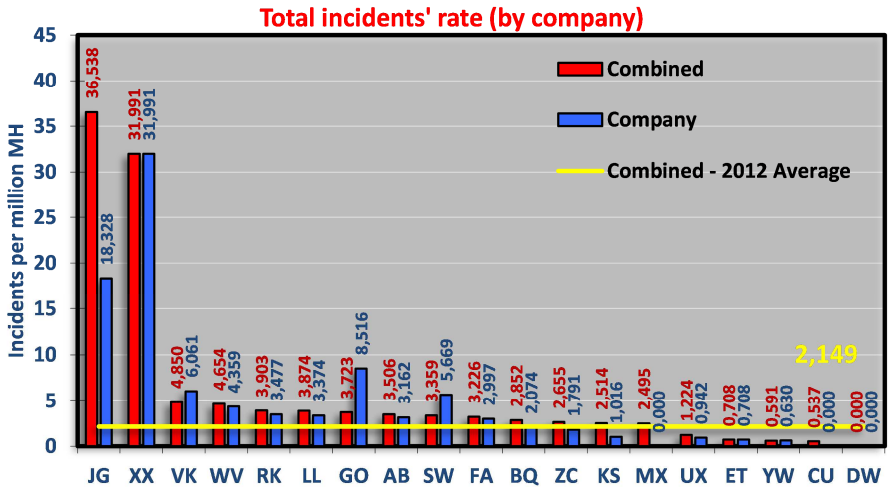


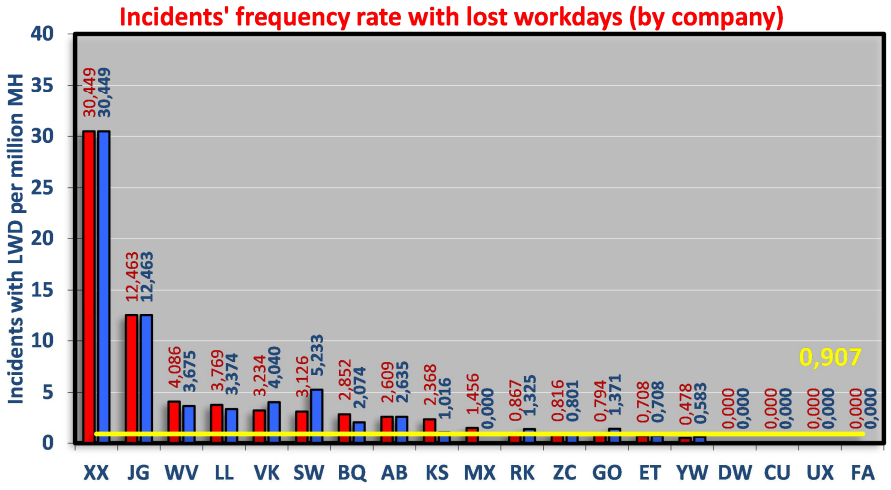


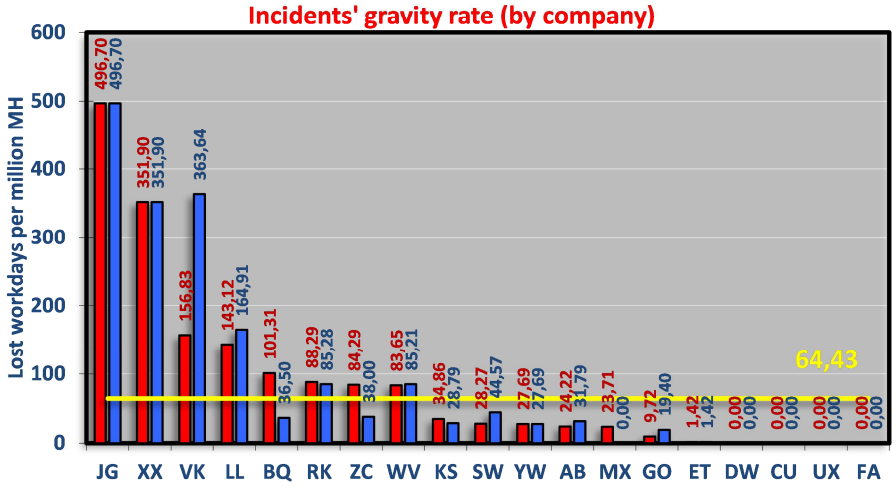


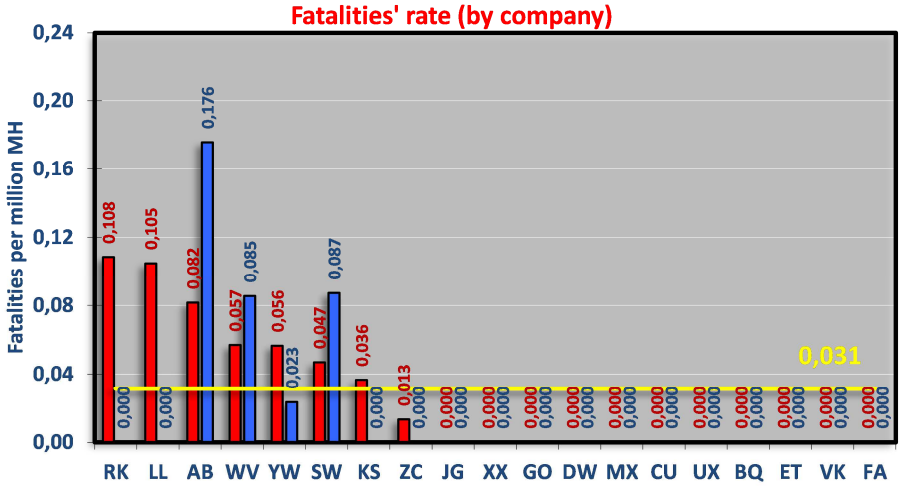


All the indicators show a great heterogeneity in safety performance, with maximum values well above regional averages.




Incidents' frequency rate with lost workdays (by company)
Incidents with LWD per million MH
40
35
30
25
20
15
10
5
0
30,449 30,449
12,463 12,463
4,086 3,675
3,769 3,374
3,234 4,040
3,126 5,233
2,852 2,074
2,609 2,635
2,368 1,016
1,456 0,000
0,867 1,325
0,816 0,801
0,794 1,371
0,708 0,708
0,478 0,583
0,000 0,000
0,000 0,000
0,000 0,000
0,000 0,000
0,907
XX JG WV LL VK SW BQ AB KS MX RK ZC GO ET YW DW CU UX FA


Incidents' gravity rate (by company)
Lost workdays per million MH
600
500
400
300
200
100
0
496,70 496,70
351,90 351,90
156,83 363,64
143,12 164,91
101,31 36,50
88,29 85,28
84,29 38,00
83,65 85,21
34,86 28,79
28,27 44,57
27,69 27,69
24,22 31,79
23,71 0,00
9,72 19,40
1,42 1,42
0,00 0,00
0,00 0,00
0,00 0,00
0,00 0,00
64,43
JG XX VK LL BQ RK ZC WV KS SW YW AB MX GO ET DW CU UX FA

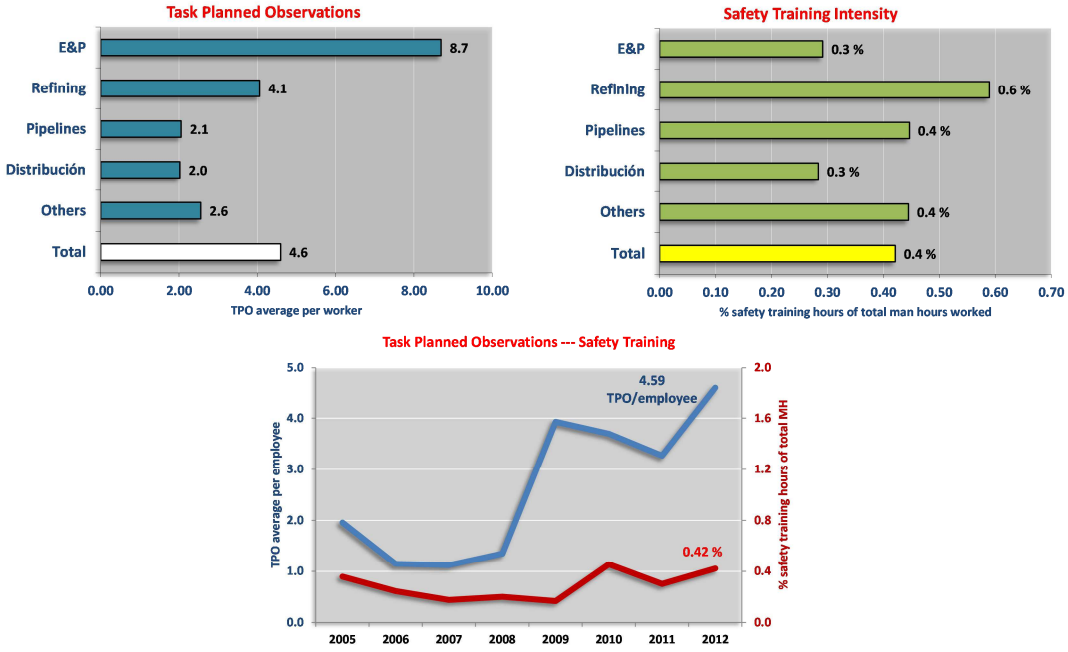

Fatalities' rate (by company)
Fatalities per million MH
0,24
0,20
0,16
0,12
0,08
0,04
0,00
0,108 0,000
0,105 0,000
0,082 0,176
0,057 0,085
0,056 0,023
0,047 0,087
0,036 0,000
0,013 0,000
0,031
RK LL AB WV YW SW KS ZC JG XX GO DW MX CU UX BQ ET VK FA

4.1.1. Evolution of reactive indicators

The following four graphs show the evolution of reactive indicators from 2000. There has been an improvement in the performance in all of them when the values for 2012 are compared to the values at the beginning of the period under study.

4.1.2. Proactive indicators

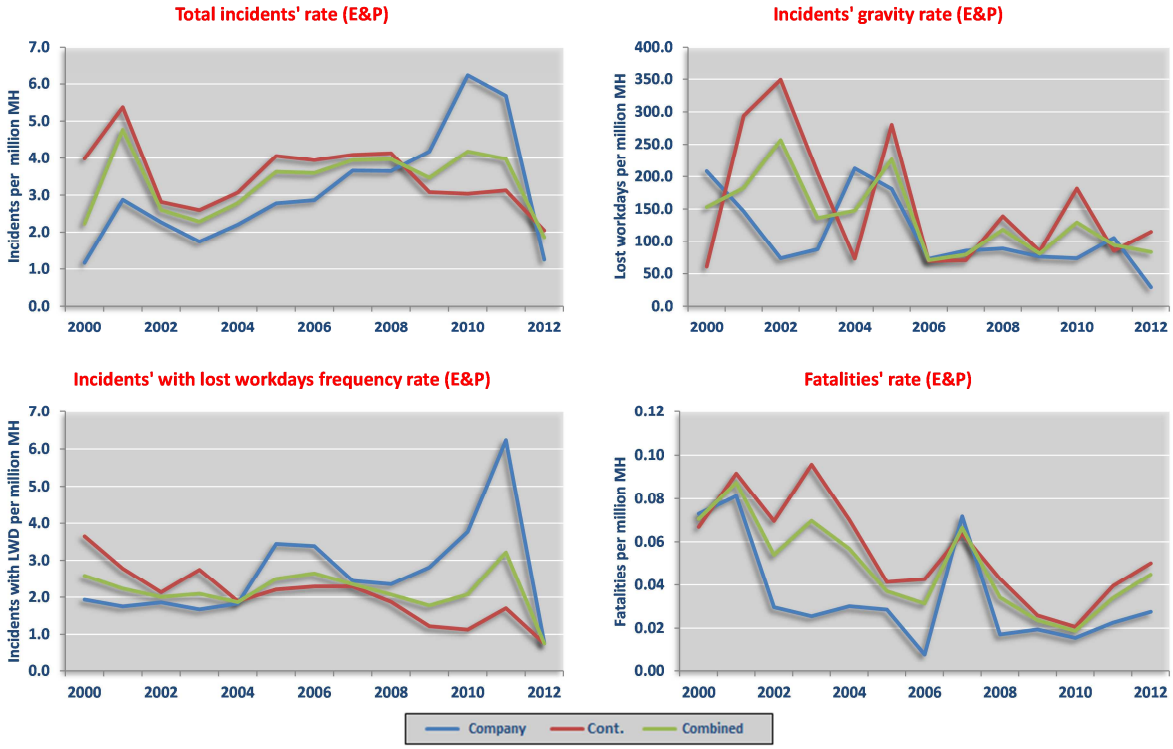
Finally, the proactive indicators are shown by function and their global evolution since 2003. These indicators also show a desirable (increasing) trend.



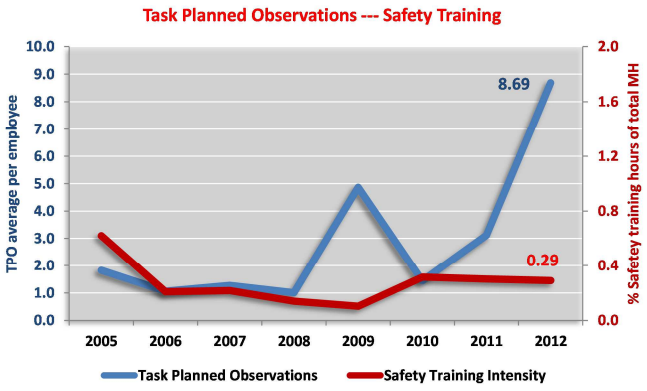
4.2. Exploration & Production

Below is the evolution of the reactive and proactive indicators for Exploration and Production. The data include offshore operations.

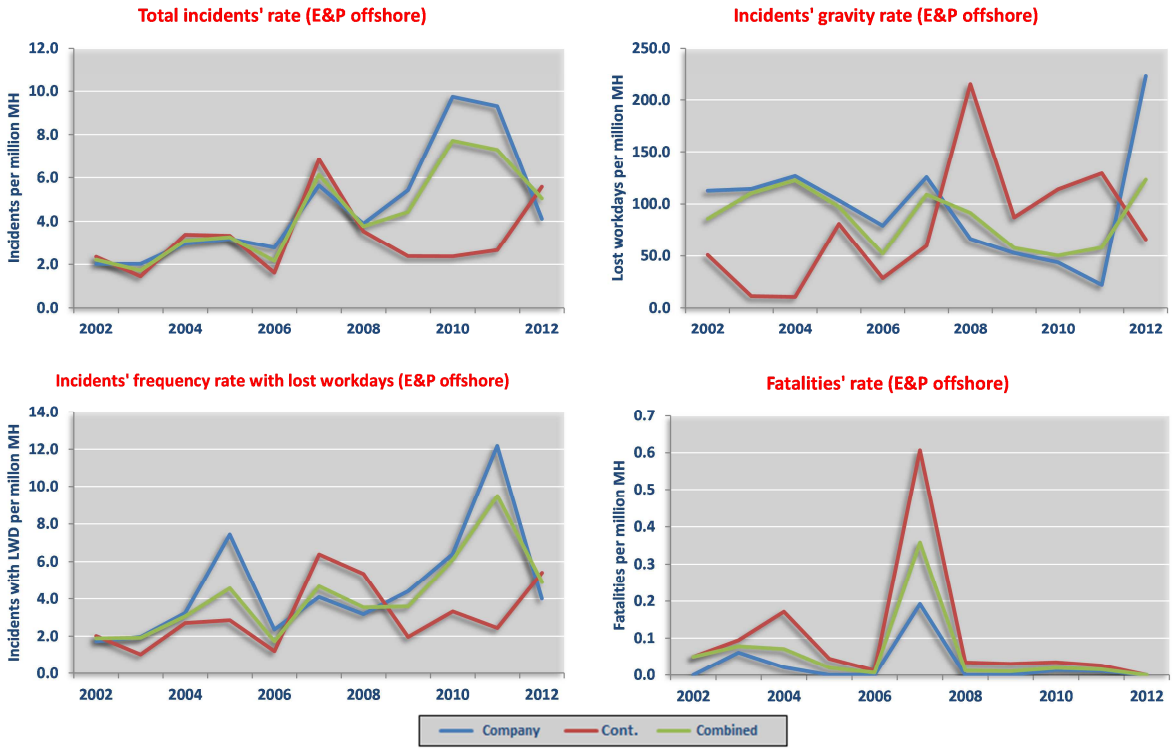
4.2.1. Reactive indicators



4.2.2. Proactive indicators



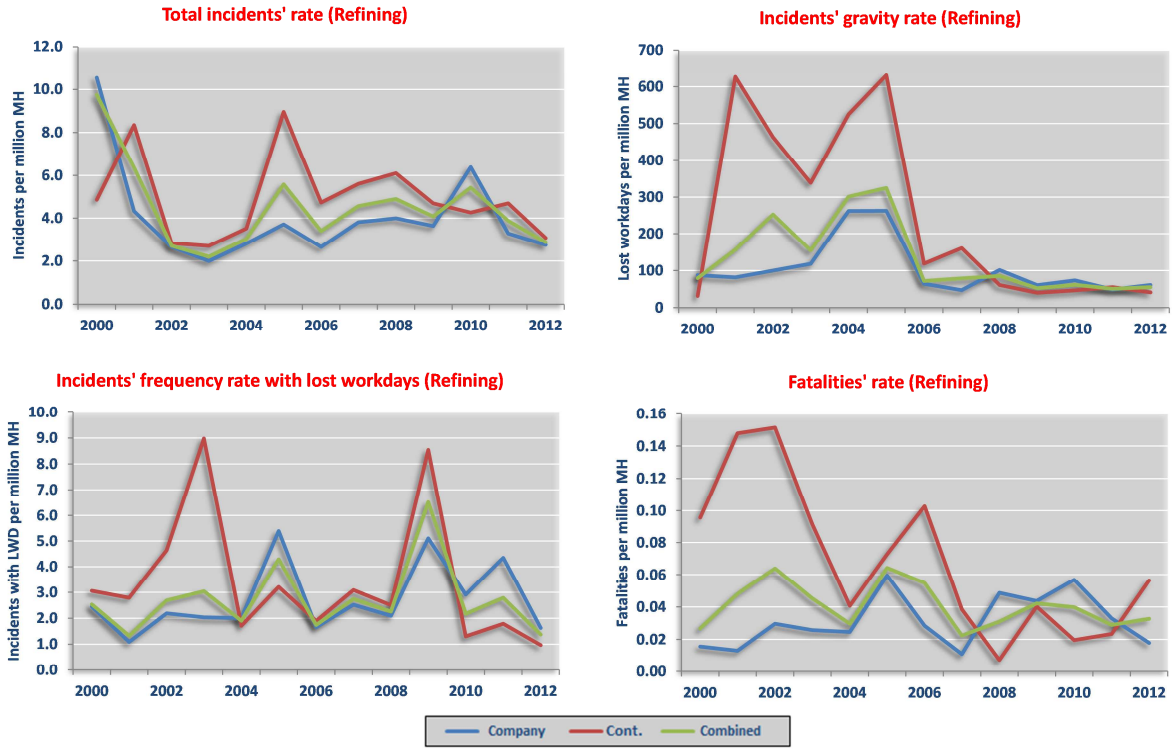
4.2.3. Reactive indicators for E&P offshore



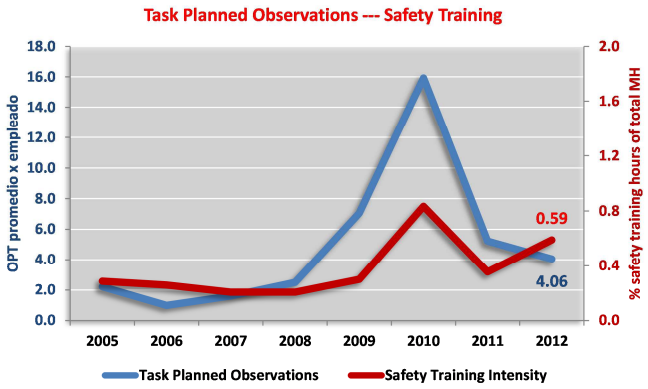
4.3. Refining

Below is the evolution of the reactive and proactive indicators for Refining.

4.3.1. Reactive indicators



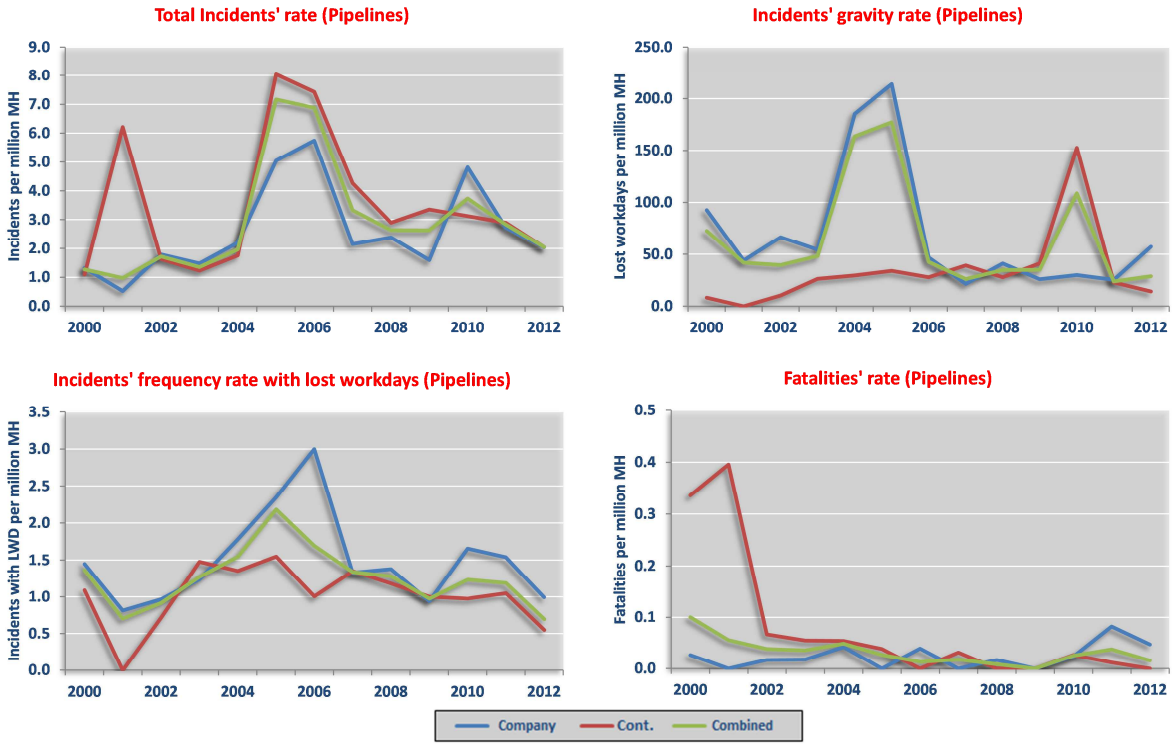
4.3.2. Proactive indicators



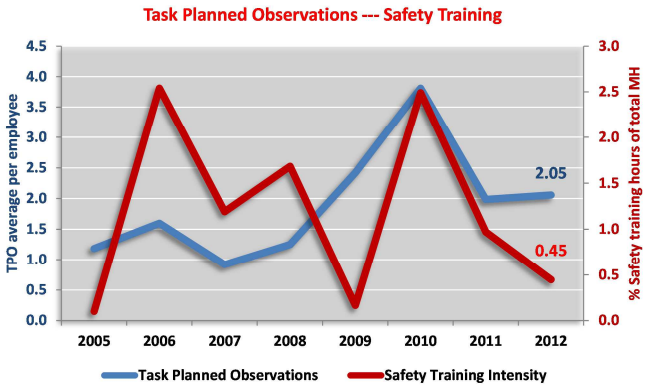
4.4. Pipelines

Below is the evolution of the reactive and proactive indicators for Pipelines. The data include the information reported in "transport – pipelines for liquids", "transport – pipelines for gases" and "transport – pipelines not separated". The data prior to 2009 correspond only to "transport - pipelines for liquids."

4.4.1. Reactive indicators



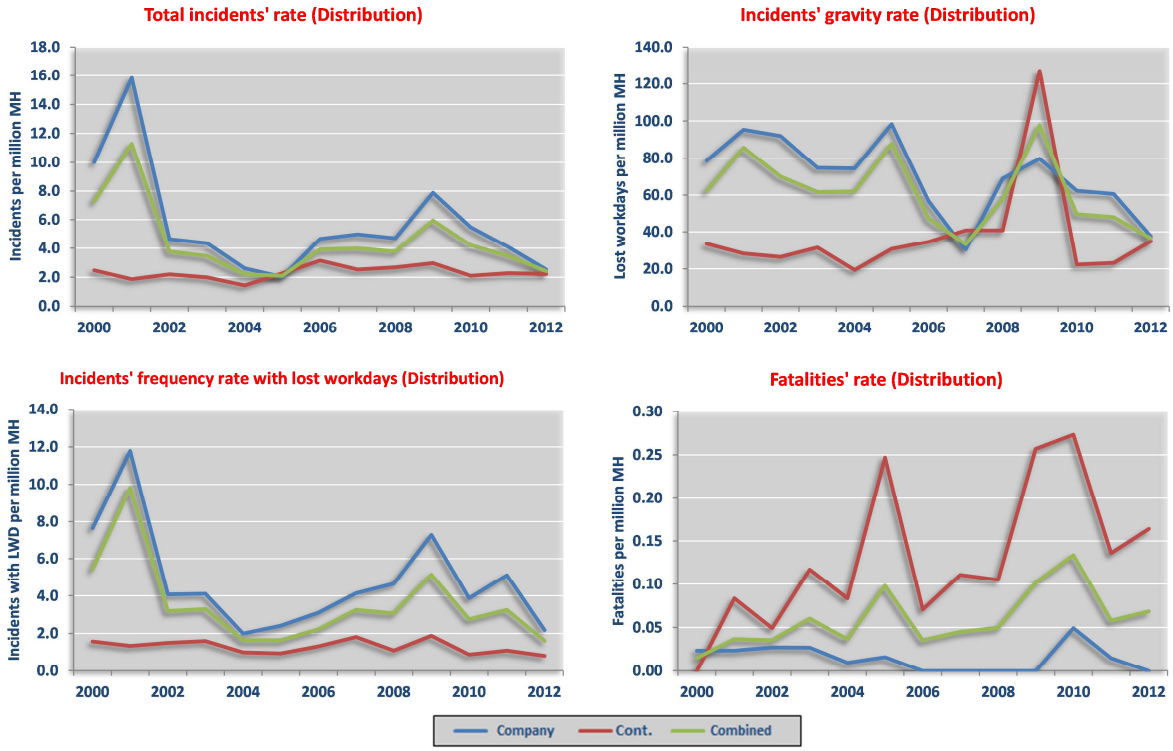
4.4.2. Proactive indicators



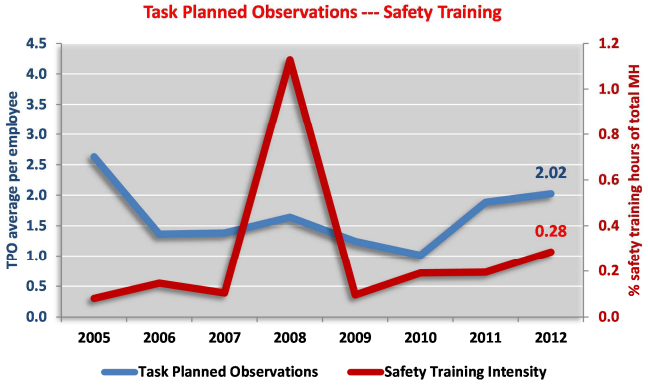
4.5. Distribution

Below is the evolution of the reactive and proactive indicators for Distribution.

4.5.1. Reactive indicators



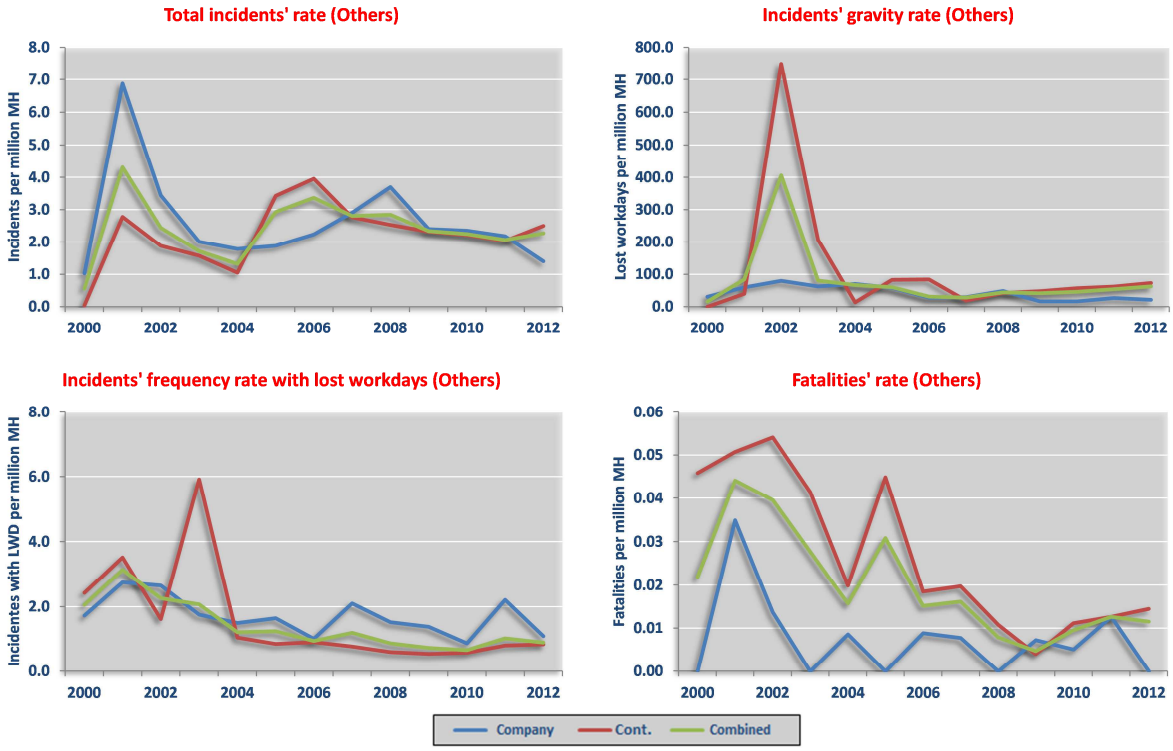
4.5.2. Proactive indicators



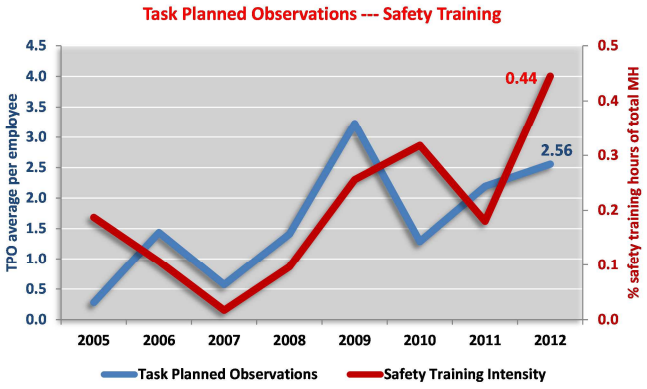
4.6. Other

Below is the evolution of the reactive and proactive indicators for Others.

4.6.1. Reactive indicators



4.6.2. Proactive indicators

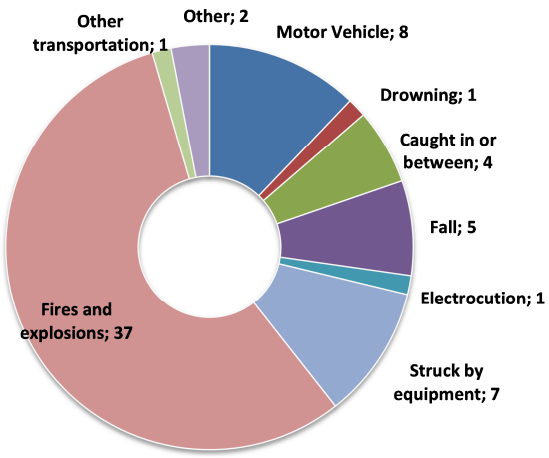


5. CAUSES OF FATALITIES

This chapter presents an analysis of the fatalities reported in 2012 by companies and contractors, providing a breakdown by cause, type of activity and function. In turn, it presents a historical comparative analysis of the causes of fatalities reported from 2001 to date.

In 2012, a total of 66 fatalities were reported, one more than those reported in 2011. The main cause of fatalities in 2012 was fires and explosions, accounting for more than 50% of the deaths due to incidents with multiple fatalities due to this cause, becoming the main historical cause of fatalities since data has been collected (2001).

5.1. Fatalities by cause



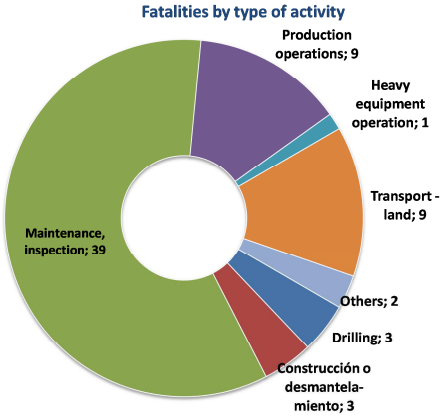
*679 Fatalities have been recorded since 2001, which means that **on average more than one worker per week loses his/her life** in the oil and gas industry in Latin America and the Caribbean.*

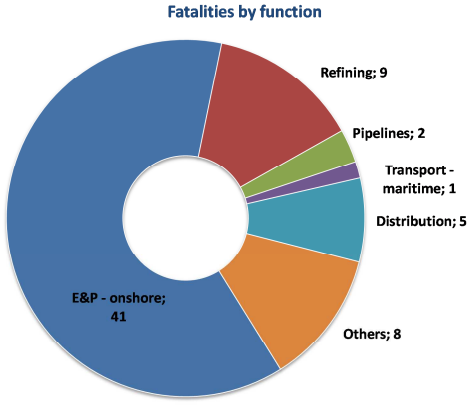
The three main causes of fatalities recorded in 2012 (fires and explosions, car accidents and hit by equipment) have followed the historical trend, as shown in the table below.

Fatalities 2001 – 2012 (by cause)		
Cause	# Fat.	%
Fires and explosions	**136**	**20%**
Motor vehicle accident	**105**	**15%**
Struck by equipment	**100**	**15%**
Fall	68	10%
Caught in or between	57	8%
Drowning	56	8%
Electrocution	50	7%
Toxic gas or liquid	36	5%
Other transportation	36	5%
Others	34	5%
No data available	1	0%
Total	**679**	**100%**

5.2. Fatalities by type of activity and work function

In 2012, Inspection and Maintenance (39) was the activity that recorded more fatalities, while E&P (41) was again the function in which more workers died during the year.





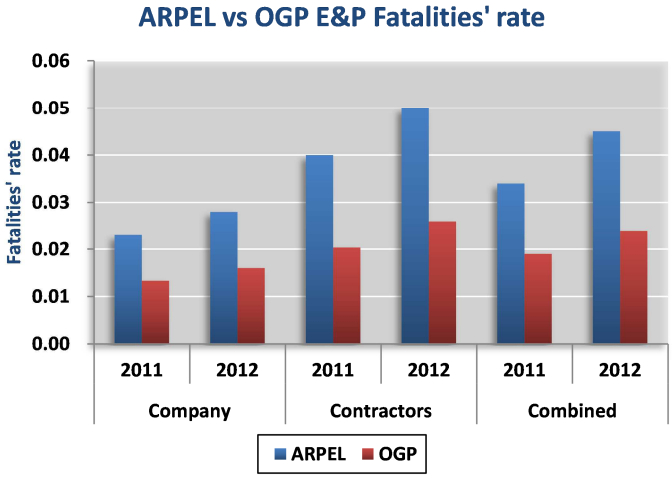
5.3. Comparisons with international references

Following is a comparison between the data of fatalities in E&P of ARPEL and OGP (International Oil and Gas Producers Association) member companies.

The overall rate of fatalities in E&P for ARPEL companies in 2012 was 0.045 fatalities per million hours worked, which represents a much higher value than that shown by OGP companies for the same period (0.024).

Fatality rates are also higher when broken down by company (0.028 ARPEL vs. 0.016 OGP) and by contractors (0.050 ARPEL vs. 0.026 OGP).

The three main causes of fatality presented by OGP ("fires and explosions", "caught in or between" and "struck by") match those recorded by ARPEL companies for E&P.



6. GLOSSARY OF TERMS

Case involving lost workdays
All non-fatal cases that result in the worker being away from work at least one business day after the day of the injury or disease. The day on which the worker goes home before the end of his workday is not considered in this item. Fatalities, as well as restricted labor activity days are excluded, since they are recorded separately.

Case involving restricted workdays
All non-fatal cases implying days of restricted activity of the usual tasks after the day of the injury or disease. Fatalities must be excluded.

Case involving medical treatment
All treatment cases of injuries / diseases administered by doctors, registered professionals or non-medical personnel. The medical treatment does not include first aids (one single treatment and the following observation of scratches, cuts, burns, splinters, and other episodes without gravity that generally do not require medical attention) even if a doctor or a registered professional provides them.

Company worker
Any person employed by the reporting company or included in its payroll.

Contractor
Any person directly involved in the execution of an assigned work for the reporting company, according to a contract.

Number of days away from work
The total number of days (consecutive or not) after the day when the injury or disease occurred, on which the workers involved (according to the definition of case involving lost workdays) should have worked but did not, as a result of the occupational injury or disease, until the day they get back to work. The day the person starts to work is excluded. Weekends and holidays are included, even if the employee was not scheduled to work.

This definition has to be distinguished from 'cases with lost work days' which include those incidents that generated lost work days –the number of incidents, not the number of days- and which is used to calculate the 'frequency of incidents with lost work days'

Recordable case - disease
Any occupational incident resulting from a disease (according to the provided classification by the legislation/regulation [if applicable] of the country where the company reports its activities). Occupational diseases resulting in fatalities are included.

Recordable case - fatality
A fatality resulting from an occupational injury or disease. The fatality should be loaded to the year in which the injury occurred or the occupational disease was recorded.

Recordable case - injury
Any occupational incident resulting in an injury (according to the provided classification by the legislation/regulation [if applicable] of the country where the company reports its activities). Occupational injuries resulting in fatalities are included.

Recordable cases - total
The sum of Recordable cases – Injury, Recordable cases – Disease and Recordable cases – Fatalities.

Tasks planned observations (TPO)
"Tasks planned observations" (TPO) are safety observations performed according to a systematic method. They constitute a recorded visual analysis in which the sequence of tasks, maneuvers and operations required to obtain a certain result of the service which is pre-established within the company, is studied by well trained and qualified personnel. The referred study includes hazard identification and risk management during normal task performance and comprises observations of immediate and basic aspects as well as systematic ones. Observations are recorded in a pre-established form according to a given procedure to determine all deviations that result in an increased probability of any human resources or material loss.

Worked hours
Hours worked by both the company workers and contractors' workers (separately recorded).

Work relatedness
An injury or disease is to be considered to be work-related if an event or exposure in the work environment caused or contributed to the resulting condition or significantly aggravated a pre-existing injury or disease. Work-relatedness is defined for injuries and diseases resulting from events or exposures occurred in the work environment, defining the work environment as the physical place where one or more employees work or are present due to work reasons. The work environment includes not only physical locations, but also the equipment or materials used by the employee during the course of his/her work.

7. ANNEXES

2012 Company Data

Function	Average # of employees	Hours worked (thousands)	Injuries	Illnesses	Fatalities	Total	Cases of Lost Workdays	Number of days away from work	Indicators: Total	Indicators: Gravity	Indicators: Cases of Lost Workdays	Indicators: Tasa de fatalidades
E&P Total	101.840	217.667	250	17	6	273	169	6.375	1,254	29,288	0,776	0,028
E&P offshore	4.841	9.945	41	0	0	41	40	2.218	4,123	223,027	4,022	0,000
Refining	70.971	168.234	389	71	3	463	273	10.282	2,752	61,117	1,623	0,018
Pipelines	19.749	42.238	83	1	2	86	42	2.422	2,036	57,342	0,994	0,047
Transport-Maritime	11.192	20.406	12	0	1	13	7	345	0,637	16,907	0,343	0,049
Distribution	19.378	42.527	108	0	0	108	93	1.600	2,540	37,623	2,187	0,000
Others	64.460	141.217	174	24	0	198	154	3.058	1,402	21,655	1,091	0,000
Total	**287.590**	**632.289**	**1.016**	**113**	**12**	**1.141**	**738**	**24.082**	**1,805**	**38,087**	**1,167**	**0,019**

2012 Contractors Data

Function	Average # of employees	Hours worked (thousands)	Injuries	Illnesses	Fatalities	Total	Cases of Lost Workdays	Number of days away from work	Indicators: Total	Indicators: Gravity	Indicators: Cases of Lost Workdays	Indicators: Tasa de fatalidades
E&P Total	261.263	697.413	1.394	1	35	1.430	530	42.641	2,050	114,791	0,760	0,050
E&P offshore	8.188	17.365	97	0	0	97	94	1.145	5,586	65,938	5,413	0,000
Refining	43.750	106.496	322	0	6	328	103	3.195	3,080	41,469	0,967	0,056
Pipelines	33.936	85.163	174	0	0	174	47	1.176	2,043	14,090	0,552	0,000
Transport-Maritime	456	1.272	2	0	0	2	2	NA	1,572	NA	1,572	0,000
Distribution	15.692	30.438	63	0	5	68	25	927	2,234	34,973	0,821	0,164
Others	264.764	552.159	1.373	0	8	1.381	462	38.162	2,501	73,495	0,840	0,014
Total	**619.861**	**1.472.941**	**3.328**	**1**	**54**	**3.383**	**1.169**	**86.101**	**2,297**	**79,891**	**0,795**	**0,037**

*** Gravity indicator is calculated with the following values of man hours worked (in thousands): E&P - 371.467 / Refining - 77.046 / Pipelines - 83.464 / Distribution - 26.506 / Others - 519.243 // Total - 1.077.727**

**** Cases of Lost Workdays Indicator is calculated with the following values of man hours worked (in thousands): Others - 550.207 // Total - 1.470.989**

2012 Combined Data

Function	Average # of employees	Hours worked (thousands)	Injuries	Illnesses	Fatalities	Total	Cases of Lost Workdays	Number of days away from work	Indicators: Total	Indicators: Gravity	Indicators: Cases of Lost Workdays	Indicators: Tasa de fatalidades
E&P Total	363.103	915.080	1.645	18	41	1.704	699	49.016	1,862	83,200	0,764	0,045
E&P offshore	13.029	27.310	138	0	0	138	134	3.363	5,053	123,142	4,907	0,000
Refining	114.721	274.730	711	71	9	791	376	13.477	2,879	54,945	1,369	0,033
Pipelines	53.685	127.401	257	1	2	260	89	3.598	2,041	28,623	0,699	0,016
Transport-Maritime	11.648	21.678	14	0	1	15	9	345	0,692	16,907	0,415	0,046
Distribution	35.070	72.965	171	0	5	176	118	2.527	2,412	36,606	1,617	0,069
Others	329.224	693.376	1.547	24	8	1.579	616	41.220	2,277	62,411	0,891	0,012
Total	**907.451**	**2.105.230**	**4.345**	**114**	**66**	**4.525**	**1.907**	**110.183**	**2,149**	**64,434**	**0,907**	**0,031**

***Gravity indicator is calculated with the following values of man hours worked (in thousands):**

E&P - 589.134 / Refining - 245.281 / Pipelines - 125.702 / Transport-Maritime - 20.406 / Distribution - 69.033 / Others - 660.460 // Total - 1.710.016

**** Cases of Lost Workdays Indicator is calculated with the following values of man hours worked (in thousands): Others - 691.424 // Total - 2.103.278**

7.1. 2012 data

7.2. Proactive indicators

Function	Average # of employees	Hours worked (thousands)	OPT	HFS	Indicators: Task Planned Observations	Indicators: Safety Training
E&P Total	29,989	25,264	260,681	73,647	8.69	0.29
Refining	16,321	20,834	66,238	122,840	4.06	0.59
Pipelines	11,751	7,109	24,148	31,749	2.05	0.45
Transport-Maritime	102	204	97	119	0.95	0.06
Distribution	5,913	5,529	11,959	15,688	2.02	0.28
Others	33,754	17,622	86,283	78,368	2.56	0.44
Total	**97,830**	**76,562**	**449,406**	**322,411**	4.59	0.42

7.3. Historical data

7.3.1. Reactive indicators

Function	Indicator	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
E&P														
E&P	Total	1,167	2,875	2,266	1,742	2,202	2,779	2,865	3,663	3,648	4,184	6,234	5,680	**1,254**
E&P	Total	3,989	5,379	2,818	2,597	3,070	4,060	3,946	4,092	4,134	3,083	3,038	3,127	**2,050**
E&P	Total	2,231	4,770	2,602	2,281	2,780	3,626	3,592	3,947	3,971	3,467	4,179	3,978	**1,860**
E&P	Gravity	208,443	146,415	73,670	87,668	212,756	180,887	72,838	85,257	88,789	76,137	73,580	105,415	**29,288**
E&P	Gravity	61,042	293,985	349,365	206,421	73,007	280,109	69,254	70,599	138,690	84,558	181,485	84,949	**114,791**
E&P	Gravity	152,856	182,395	256,546	135,954	147,310	226,574	70,764	78,978	117,956	80,649	129,142	94,096	**83,200**
E&P	Lost Workdays	1,937	1,754	1,858	1,674	1,829	3,447	3,385	2,446	2,355	2,813	3,775	6,234	**0,776**
E&P	Lost Workdays	3,654	2,779	2,133	2,746	1,893	2,210	2,289	2,289	1,878	1,224	1,131	1,705	**0,760**
E&P	Lost Workdays	2,585	2,238	2,009	2,094	1,872	2,497	2,650	2,354	2,076	1,777	2,082	3,217	**0,764**
E&P	Fatalities	0,073	0,081	0,030	0,026	0,030	0,029	0,008	0,072	0,017	0,019	0,016	0,023	**0,028**
E&P	Fatalities	0,067	0,092	0,070	0,096	0,070	0,041	0,043	0,064	0,043	0,026	0,021	0,040	**0,050**
E&P	Fatalities	0,071	0,088	0,054	0,070	0,057	0,037	0,031	0,067	0,034	0,024	0,019	0,034	**0,045**
Refining														
Refining	Total	10,543	4,337	2,667	1,999	2,815	3,719	2,660	3,822	4,000	3,642	6,398	3,294	**2,752**
Refining	Total	4,872	8,356	2,832	2,699	3,523	8,967	4,741	5,613	6,118	4,706	4,272	4,699	**3,080**
Refining	Total	9,748	6,368	2,713	2,209	3,036	5,585	3,402	4,568	4,904	4,080	5,434	3,876	**2,879**
Refining	Gravity	87,293	81,486	99,711	118,139	262,201	263,005	64,077	47,367	101,506	60,388	73,248	48,707	**61,117**
Refining	Gravity	31,669	626,472	463,375	339,274	525,086	630,935	118,871	160,858	60,941	40,412	46,484	55,182	**41,469**
Refining	Gravity	79,491	156,027	252,275	153,953	301,468	325,390	72,034	78,747	85,394	52,660	61,542	51,075	**54,945**
Refining	Lost Workdays	2,447	1,092	2,186	2,029	2,001	5,394	1,654	2,518	2,095	5,110	2,909	4,345	**1,623**
Refining	Lost Workdays	3,057	2,788	4,638	8,981	1,707	3,206	1,897	3,085	2,497	8,543	1,299	1,789	**0,967**
Refining	Lost Workdays	2,532	1,333	2,682	3,038	1,906	4,292	1,738	2,743	2,255	6,523	2,170	2,786	**1,369**
Refining	Fatalities	0,016	0,013	0,030	0,026	0,025	0,060	0,028	0,011	0,049	0,044	0,057	0,033	**0,018**
Refining	Fatalities	0,096	0,148	0,151	0,091	0,041	0,073	0,103	0,038	0,007	0,040	0,020	0,023	**0,056**
Refining	Fatalities	0,027	0,048	0,064	0,045	0,030	0,064	0,055	0,022	0,031	0,042	0,040	0,029	**0,033**
Pipelines														
Pipelines	Total	1,319	0,529	1,786	1,475	2,192	5,042	5,744	2,143	2,380	1,590	4,811	2,716	**2,036**
Pipelines	Total	1,093	6,215	1,631	1,225	1,754	8,042	7,431	4,261	2,893	3,351	3,123	2,891	**2,043**
Pipelines	Total	1,265	0,975	1,719	1,353	1,956	7,169	6,877	3,321	2,635	2,632	3,730	2,827	**2,041**
Pipelines	Gravity	92,626	44,051	66,453	54,432	185,335	214,104	46,918	21,505	41,120	25,910	29,977	25,393	**57,342**
Pipelines	Gravity	8,153	0,000	10,192	26,136	29,478	33,931	27,681	38,982	27,730	40,909	152,685	22,808	**14,090**
Pipelines	Gravity	72,450	41,816	39,440	48,044	163,410	177,237	42,433	26,016	34,572	34,787	108,580	23,778	**28,623**
Pipelines	Lost Workdays	1,451	0,815	0,967	1,239	1,782	2,348	3,000	1,330	1,381	0,941	1,656	1,541	**0,994**
Pipelines	Lost Workdays	1,093	0,000	0,718	1,480	1,356	1,550	1,008	1,353	1,182	1,004	0,978	1,051	**0,552**
Pipelines	Lost Workdays	1,365	0,707	0,920	1,276	1,549	2,185	1,694	1,343	1,284	0,978	1,237	1,191	**0,699**
Pipelines	Fatalities	0,026	0,000	0,017	0,018	0,042	0,000	0,039	0,000	0,017	0,000	0,024	0,082	**0,047**
Pipelines	Fatalities	0,336	0,396	0,067	0,055	0,054	0,038	0,000	0,032	0,000	0,000	0,026	0,012	**0,000**
Pipelines	Fatalities	0,100	0,056	0,038	0,036	0,049	0,027	0,013	0,018	0,008	0,000	0,025	0,038	**0,016**
Distribution														
Distribution	Total	10,013	15,857	4,642	4,364	2,617	2,024	4,662	4,985	4,700	7,881	5,485	4,081	**2,540**
Distribution	Total	2,483	1,867	2,203	1,991	1,439	2,266	3,162	2,530	2,691	2,970	2,104	2,289	**2,234**
Distribution	Total	7,268	11,296	3,773	3,467	2,189	2,110	3,917	3,987	3,771	5,934	4,211	3,446	**2,412**
Distribution	Gravity	78,701	95,350	92,071	74,798	74,511	98,448	56,815	30,489	69,055	79,820	62,334	60,666	**37,623**
Distribution	Gravity	33,557	28,241	26,401	31,468	19,532	30,793	34,618	40,859	40,878	127,176	22,337	23,255	**34,973**
Distribution	Gravity	62,248	85,829	70,102	61,742	62,087	87,951	47,456	33,278	57,873	97,948	49,745	48,087	**36,606**
Distribution	Lost Workdays	7,640	11,789	4,089	4,117	2,006	2,420	3,119	4,149	4,664	7,287	3,882	5,115	**2,187**
Distribution	Lost Workdays	1,572	1,339	1,497	1,601	1,004	0,946	1,314	1,811	1,093	1,880	0,881	1,092	**0,821**
Distribution	Lost Workdays	5,429	9,830	3,184	3,292	1,642	1,634	2,223	3,246	3,066	5,143	2,750	3,252	**1,617**
Distribution	Fatalities	0,024	0,024	0,027	0,027	0,010	0,016	0,000	0,000	0,000	0,000	0,050	0,015	**0,000**
Distribution	Fatalities	0,000	0,084	0,049	0,117	0,084	0,247	0,071	0,111	0,105	0,257	0,273	0,136	**0,164**
Distribution	Fatalities	0,015	0,037	0,035	0,060	0,036	0,098	0,035	0,045	0,050	0,101	0,134	0,058	**0,069**
Others														
Others	Total	1,030	6,879	3,441	2,011	1,784	1,880	2,235	2,903	3,701	2,403	2,350	2,180	**1,402**
Others	Total	0,046	2,775	1,877	1,573	1,050	3,425	3,959	2,767	2,530	2,323	2,217	2,033	**2,501**
Others	Total	0,559	4,318	2,441	1,718	1,320	2,933	3,368	2,807	2,846	2,340	2,253	2,066	**2,277**
Others	Gravity	30,757	59,755	80,054	62,328	70,119	58,436	28,131	29,100	48,379	17,594	16,696	26,965	**21,655**
Others	Gravity	0,000	40,308	749,648	206,377	13,799	83,378	84,504	19,148	42,262	48,340	57,390	62,079	**73,495**
Others	Gravity	16,039	84,015	406,346	80,217	67,041	59,707	31,010	28,035	44,011	41,326	46,015	53,944	**62,411**
Others	Lost Workdays	1,724	2,755	2,652	1,756	1,499	1,648	1,013	2,100	1,525	1,384	0,871	2,213	**1,091**
Others	Lost Workdays	2,428	3,521	1,619	5,919	1,050	0,852	0,907	0,769	0,601	0,546	0,583	0,803	**0,840**
Others	Lost Workdays	2,061	3,144	2,262	2,071	1,212	1,241	0,943	1,195	0,865	0,728	0,660	1,022	**0,891**
Others	Fatalities	0,000	0,035	0,014	0,000	0,009	0,000	0,009	0,008	0,000	0,007	0,005	0,013	**0,000**
Others	Fatalities	0,046	0,051	0,054	0,041	0,020	0,045	0,019	0,020	0,011	0,004	0,011	0,013	**0,014**
Others	Fatalities	0,022	0,044	0,040	0,028	0,016	0,031	0,015	0,016	0,008	0,005	0,010	0,013	**0,012**
Total														
Total	Total	5,320	5,319	2,784	2,167	2,351	2,811	2,869	3,579	3,723	3,835	5,061	4,130	**1,805**
Total	Total	2,709	5,462	2,484	2,196	2,381	4,542	4,232	3,842	3,748	2,967	2,772	2,828	**2,297**
Total	Total	4,494	5,415	2,632	2,183	2,368	3,808	3,671	3,738	3,738	3,287	3,609	3,291	**2,149**
Total	Gravity	119,188	101,406	85,615	89,572	174,093	166,014	60,290	54,950	78,952	57,608	54,537	68,018	**38,087**
Total	Gravity	34,963	320,162	356,408	188,257	115,214	295,429	65,242	83,563	84,600	62,625	102,874	66,155	**79,891**
Total	Gravity	92,562	150,936	228,874	118,290	157,413	202,007	62,330	64,096	82,174	60,496	82,393	66,925	**64,434**
Total	Lost Workdays	2,668	2,973	2,276	2,054	1,838	3,183	2,313	2,479	2,226	3,387	2,738	4,695	**1,167**
Total	Lost Workdays	2,817	2,783	2,260	3,390	1,555	1,952	1,817	1,834	1,431	1,733	0,904	1,251	**0,795**
Total	Lost Workdays	2,715	2,907	2,269	2,410	1,679	2,402	2,023	2,120	1,771	2,343	1,573	2,216	**0,907**
Total	Fatalities	0,034	0,043	0,026	0,021	0,022	0,028	0,017	0,032	0,021	0,020	0,022	0,025	**0,019**
Total	Fatalities	0,074	0,095	0,074	0,080	0,055	0,061	0,044	0,048	0,029	0,025	0,024	0,029	**0,037**
Total	Fatalities	0,047	0,067	0,050	0,053	0,040	0,047	0,033	0,042	0,026	0,023	0,023	0,028	**0,031**

7.3.2. Reactive indicators (E&P offshore)

Indicator	Category	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total	Company	2.04	2.03	2.98	3.20	2.79	5.64	3.90	5.43	9.75	9.31	**4.123**
Total	Contractors	2.36	1.46	3.40	3.35	1.62	6.86	3.55	2.39	2.38	2.68	**5.586**
Total	Combined	2.22	1.73	3.11	3.27	2.17	6.13	3.77	4.43	7.72	7.29	**5.053**
Gravity	Company	112.40	114.22	126.48	103.24	79.26	125.55	66.57	52.69	43.74	22.06	**223.027**
Gravity	Contractors	50.90	11.29	10.58	81.04	28.58	59.84	215.16	87.12	113.89	129.24	**65.938**
Gravity	Combined	85.80	110.27	122.46	97.37	52.12	108.88	91.38	57.73	50.36	58.06	**123.142**
Lost Workdays	Company	1.74	1.97	3.25	7.44	2.36	4.10	3.18	4.41	6.41	12.19	**4.022**
Lost Workdays	Contractors	2.01	1.03	2.71	2.85	1.20	6.39	5.36	1.95	3.32	2.44	**5.413**
Lost Workdays	Combined	1.90	1.93	3.07	4.58	1.74	4.68	3.55	3.60	6.12	9.49	**4.907**
Fatalities	Company	n/a	0.06	0.02	0.00	0.00	0.19	0.00	0.00	0.01	0.01	**0.000**
Fatalities	Contractors	0.05	0.09	0.17	0.04	0.01	0.61	0.03	0.03	0.04	0.03	**0.000**
Fatalities	Combined	0.05	0.08	0.07	0.02	0.01	0.36	0.01	0.01	0.02	0.02	**0.000**

7.3.3. Proactive indicators

Task Planned Observations Indicator (Company)								
Function	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
E&P	1.83	1.07	1.28	1.01	4.87	1.45	3.12	8.69
Refining	2.21	0.99	1.60	2.51	7.05	15.93	5.22	4.06
Pipelines	1.18	1.59	0.92	1.25	2.42	3.81	1.98	2.05
Distribution	2.63	1.36	1.38	1.64	1.24	1.01	1.88	2.02
Others	0.28	1.44	0.57	1.41	3.23	1.29	2.19	2.56
Global	**1.96**	**1.15**	**1.12**	**1.35**	**3.93**	**3.70**	**3.27**	**4.59**

Safety Training Intensity (Company)								
Function	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
E&P	0.62	0.21	0.22	0.14	0.10	0.32	0.30	0.29
Refining	0.29	0.26	0.21	0.21	0.30	0.83	0.35	0.59
Pipelines	0.10	2.54	1.19	1.68	0.16	2.49	0.97	0.45
Distribution	0.08	0.15	0.10	1.13	0.10	0.19	0.19	0.28
Others	0.19	0.11	0.02	0.10	0.26	0.32	0.18	0.44
Global	**0.36**	**0.24**	**0.18**	**0.20**	**0.17**	**0.45**	**0.30**	**0.42**

8. REFERENCES

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Regional Association of Oil, Gas and Biofuels Sector Companies in Latin America and the Caribbean

ARPEL is a non-profit association gathering companies and institutions of the oil, gas and biofuels sector in Latin America and the Caribbean. It was founded in 1965 with the primary purpose of promoting industry integration and growth as well as seeking ways to maximize its contribution to sustainable energy development in the region.

Its membership represents over 90% of the upstream and downstream activities in the region and includes national and international oil companies, companies providing technology, goods and services to the industry value chain, and oil, natural gas and biofuels sector institutions.

Since 1976 ARPEL holds Special Consultative Status with United Nations Economic and Social Council (ECOSOC). In 2006, the association declared its adherence to UN Global Compact principles.

Mission

To foster and facilitate industry development and integration, continuous operational improvement and effective management of environmental and social issues, by:

- developing, sharing and disseminating best practices;
- carrying out studies that translate in information of value;
- broadening knowledge and helping build required competencies;
- networking and engaging members and stakeholders in constructive dialogue.

Vision

A growing, competitive and integrated oil, gas and biofuels industry that achieves operational and management excellence, and effectively contributes to the sustainable energy development in Latin America and the Caribbean.

Value proposition

ARPEL offers a unique mean for networking, sharing knowledge, joining efforts and building synergies in favor of the sector's integration, growth and sustainability. Without any distinction, members have the opportunity to alternatively lead activities and projects, contribute with their know-how to their development, or learn from the experiences of other members.

ARPEL's value is also reflected in its condition of strategic information center about sector activities in the region and cost-effective vehicle for the development of publications on best practices and benchmarking, as well as on sectoral studies and executive reports aimed at diverse stakeholders. The Association additionally stands out for its regional conferences, forums and seminars of high impact in the industry.

ARPEL is a recognized regional body of representation for the sector that seeks to advocate in favor of the common interests of its membership and to enhance the industry's public image and reputation.

Socio-environmental sustainability
Operational excellence
Sectoral development
July, 2013

Members Companies and Institutions

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