WORK & SAFETY ANALYSIS 2019

irata®
International
Industrial Rope Access
Trade Association

ABSTRACT

The report examines data for employment and accident/incident reports submitted by IRATA International (IRATA) members over the period January – December 2018, during which time membership increased to 443 by Q4. This was an increase of 54 members operating worldwide. Total employment rose to 16,626 and associated work hours increased to 20 million hours.

There were 166 acceptable reported incident events, of which 101 were ‘Near Misses’. Injuries and illnesses accounted for 65, of which only 5 were ‘Reportable’ to authorities. No fatalities were reported. The overall ‘Reportable’ injury rate, based on full time working, was between 3-20% of all latest internationally available work injury statistics. This maintained an excellent safety record for the Association. The absence of any fatality in 2018 allowed the five year fatality rate to fall to within the typical range of commensurate industries.

Several areas of positive improvements were identified, most prominently the reduction in instances of rope damage. Areas where safe working could be improved include identification of site hazards, better third party work site communications and, more specifically, checking adequacy of tethers or lanyards to prevent dropped tools and equipment.

Dr C H Robbins
28 July 2019

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INTRODUCTION

IRATA International (IRATA), formed in 1989, requires members of the Association to submit employment as well as accident or incident data. In the case of the latter, any situation involving loss of control of a hazard would be reportable to IRATA, either as an accident (i.e. injury/fatality) or as a near miss (i.e. no injury). (See **Appendix II** for description or explanation of various terms used in this report).

This report presents summaries of the data provided for the period January - December 2018 by all member companies. It is important to note that the number of employees reported relates to member company employees only. Thus, IRATA qualified individuals who are not employees of members are not covered by this report.

To calculate accident and incident rates it is essential to have details not only of the accidents and incidents but also the accompanying employment data. Gratitude is due to those with the task of submitting required data and also to the IRATA staff who assembled and presented the data for analysis. All data supplied was subject to quality checks prior to analysis.

The report is arranged with figures, graphs and tables incorporated within the text to which they apply. The report presents conclusions and makes recommendations, based on the data supplied, identifying specific work issues of relatively high frequency and/or seriousness.

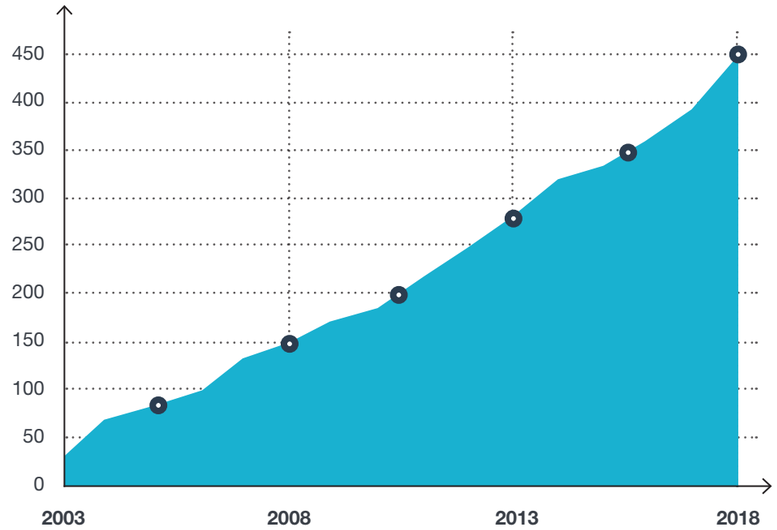
IRATA MEMBERSHIP

Fig 1 shows the continuing increase in membership of the Association accelerating from 389 in 2017 to 443 by Q4 in 2018, an increase of nearly 14%.

(Note that the 'membership' referred to in this report was limited to the number of companies submitting data in the last quarter of the year).

Increases in membership continued for several Regional Advisory Committees (RACs) (See 3.4 for description of RACs), notably Australasia (+7), Mediterranean (+7), Middle East, Central Asia & South Asia (MECASA) (+15), North America (+4), SE Asia and Far East (+7) together with increases in North Sea Operators (+8) and UK (+6). The introduction of an additional RAC, Eastern Europe, added a further 28 members. This more than balanced a loss of 17 members from the 'Other' RAC which were probably transferred to the new RAC.

Fig 1 • IRATA Membership



3. EMPLOYMENT STATISTICS

3.1 EMPLOYMENT LEVELS

The average employment figures for 2018 of 16,626 was a rise of ~ 7% over the previous year, somewhat less than the rise in membership. (Note that the employment figures are taken as the average of the four quarterly figures submitted for the year). Total employment numbers, including trainers, over the last 3 years were:

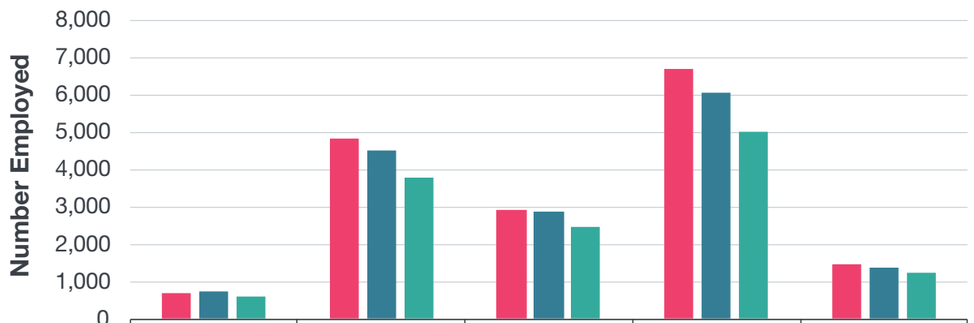
2016 – 13,100
2017 – 15,530
2018 – 16,626

Fig 2 shows the overall distribution of employment for the various grades. The virtually static number of Level 2 technicians, with an apparent increase of only 11, is simply the net difference between those gaining Level 3 proficiency (344) and those rising from Level 1 to Level 2 plus any losses. Similarly, the apparent rise of ~660 Level 1 recruits really represents an increase of over ~1,000 as this includes the 'loss' of ~330 needed to maintain the Level 2 numbers (ignoring losses that probably exceeded ~300 judging by quarter by quarter figures not presented).

The roughly 1:2 ratio of Level 3 supervisory level technicians to Level 1 & 2 technicians may be noted. This maintains the same ratio for the last three years. It is perhaps surprising that, despite the 7% increase in employed qualified technicians, there was a 3.5% fall in the average number of managers. However, by Q4 the number of managers had actually increased to 763, an increase of ~4.4% over the 2017 figure.

Qualified working grades of Level 1 to 3 accounted for 87% of the total employed numbers. The chart does not show the quarter by quarter changes that took place during the year that, for example, showed a peak of 7,038 for Level 1 technicians in Q3.

Fig 2 • Employment by Grade



	Manager	L3	L2	L1	Other
2018	705	4,836	2,904	6,699	1,482
2017	731	4,492	2,893	6,038	1,377
2016	599	3,773	2,494	4,993	1,241

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3.2 HOURS WORKED

The total hours worked in 2018 was 19,960,912, i.e. about **20 million**, including training. This is an increase of 9.8% over the 18,182,076 recorded in 2017, which is not quite pro rata to the membership increase of ~ 14%. **Fig 3** shows the distribution of these worked hours for each grade for the last three years.

As expected, work hours were roughly in proportion to the employment levels. Utilisation (hours worked divided by number of employees) for the last three years is given in the table on the right.

This shows little change, remaining well below a maximum utilisation of about 2,000 hours per worker per annum and may be due to technicians using technical skills elsewhere, not involving rope access.

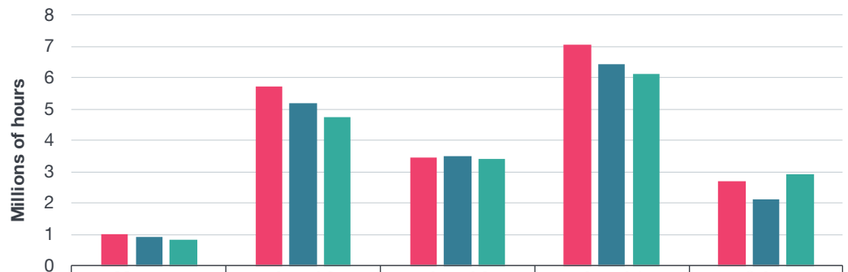
A negative consequence of a low utilisation was that the 'effective' workforce was greatly reduced, as accident rates relate to 'full time employees'. Thus, the reported workforce of 16,626 reduces to a full time workforce of only 16,626 x 1,201/2,000 = ~10,000.

Turning now to the location of work hours, **Fig 4** compares the distribution of work hours between onshore and offshore alongside the previous year (including training).

Much of the increase in work hours was recorded for work onshore. Onshore working significantly exceeded offshore by ~2.8 million hours. The chart also shows training figures which will now be examined.

Year	Utilisation (Hours/ Worker per annum)
2016	1,381
2017	1,171
2018	**1,201**

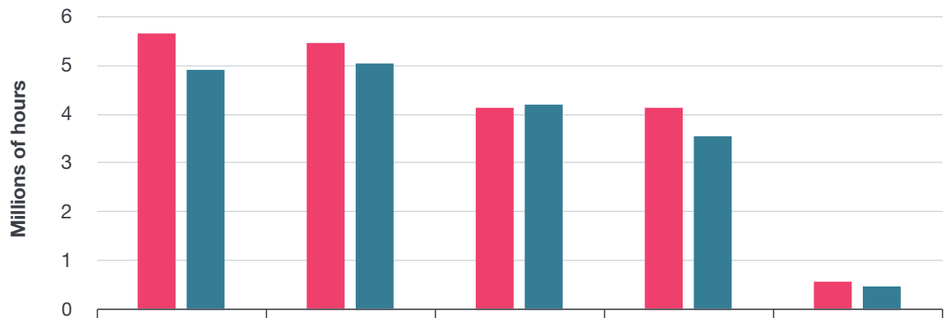
Fig 3 • Distribution of Work Hours by Grade



	Manager	Level 3	Level 2	Level 1	Other
2018	1,019,505	5,715,019	3,459,854	7,082,649	2,683,884
2017	939,426	5,175,527	3,510,429	6,424,189	2,132,503
2016	855,948	4,770,598	3,412,186	6,122,579	2,930,145

(Note that quarterly work hours are summed)

Fig 4 • Distribution of Work Hours by Location



	Onshore on ropes	Onshore other	Offshore on ropes	Offshore other	Training
2018	5,642,598	5,477,816	4,142,020	4,137,744	560,733
2017	4,925,960	5,039,163	4,198,605	3,538,890	479,459

3.3 TRAINING

Training referred to in this report solely relates to rope access training. The total of hours reported for training were **560,733** (479,459 in 2017) which is about 2.8% of the 20 million work hours. This is well in excess of a pro rata increase due to the 7% increase in employment over 2017 but, as will be seen later, this varied considerably between the RACs.

The total of 'promotions between the grades was about 330 for Level 2 to Level 3, with a similar rise of ~ 330 for Level 1 to 2 and recruitment of an additional ~ 660 to Level 1. This would require a total of about 1,500 courses and assessments (allowing for some repeats and aborted courses) of about 40 hours each, consuming about 60,000 hours. Added to this would be refreshers and other rope access related training. The total of training hours, of over half a million hours, for a workforce of only ~ 17,000 equates to about 33 hours per person per annum, reflecting the emphasis placed on training by the Association. However, there may be some element of mis-reporting (see later in the section following).

3.4 REGIONAL ADVISORY COMMITTEES (RACs)

In 2012, it was decided that zones or regions around the world would be established and overseen by Regional Advisory Committees (RACs). There are currently 14 RACs, including the latest addition of Eastern Europe in 2018, as follows:

- Australasia
- Benelux
- Brazil
- D-A-CH (Germany, Austria and Switzerland)
- Eastern Europe
- Mediterranean
- Middle East, Central Asia & South Asia (MECASA)
- North America
- North Sea Operators
- Other (West Africa)
- Scandinavia
- South Africa
- South East Asia and Far East
- UK

Table 1 summarises the figures for the individual RACs and contribution to the overall 2018 Association data, together with membership numbers, employment, work hours and calculated utilisation of employed technicians.

The variation in utilisations between RACs may be noted, from as low as 668 to as high as 1,797. It is not possible to compare data for some RACs with previous years due to the introduction of an additional RAC. Typically, the average number of employed technicians per member company was about 40 but this varied very broadly between RACs, where figures typically vary from as low as 8 to over 50. The employment range for individual companies within RACs, as expected, was much greater.

Table 1 • 2018 RAC Summary

RAC	No. of members (at year end)	No. employed (average of 4Qs)	No. of work hours	Utilisation (hours per employee)	% of total work hours
Australasia	41	1,566	1,691,707	1,081	8.5
Benelux	21	486	458,535	944	2.3
Brazil	25	730	488,161	668	2.4
D-A-CH	6	46	61,157	1,337	0.3
Eastern Europe	28	432	341,309	790	1.7
Mediterranean	17	208	188,940	908	0.9
MECASA	44	2,139	3,842,246	1,797	19.3
North America	27	1,278	1,199,645	939	6.0
North Sea Operators	21	2,234	3,150,999	1,411	15.8
Other	23	894	1,333,508	1,492	6.7
Scandinavia	12	225	180,577	803	0.9
South Africa	13	321	436,469	1,362	2.2
SEA & FE	58	1,567	1,517,552	969	7.6
United Kingdom	107	4,503	5,070,108	1,126	25.4
Total or averages	**443**	**16,626**	**19,960,912**	**1,201**	**100.0**

Table 2 • 2018 RAC Distribution of Grades

RAC	Managers	Level 3	Level 2	Level 1	Other
Australasia	69	558	256	641	42
Benelux	31	165	81	159	51
Brazil	27	185	127	340	52
D-A-CH	7	19	4	5	11
Eastern Europe	32	136	71	168	26
Mediterranean	26	47	33	82	20
MECASA	83	432	435	812	377
North America	51	280	166	709	71
North Sea Operators	31	707	324	927	244
Other	25	358	172	258	81
Scandinavia	23	88	65	35	14
South Africa	22	95	59	81	64
SEA & FE	97	418	272	662	118
United Kingdom	182	1,447	838	1,722	313
Total	**705**	**4,836**	**2,904**	**6,699**	**1,482**

The distribution of employment between grades for each RAC is given in **Table 2**. Individual RACs and members may compare their own figures with the overall averages. As expected, there was great variation in the proportions of the main working grades although, in general, the ratio of one Level 3 to two Level 1 or 2 technicians was maintained.

Table 3 shows the differences between RACs in terms of the balance between onshore and offshore working. Extreme examples are North Sea Operators who, by definition, are predominantly involved in offshore work versus, say, MECASA, D-A-CH or North America that are predominantly onshore working; whereas, others have a balance between the two such as South Africa, South East Asia & Far East or UK.

Even a superficial scan of **Table 3** training figures suggests significant variations exist between RACs. Accordingly, **Table 4** takes the training hours and presents them as a percentage of the overall work hours for each RAC and the variations now become very apparent.

The North Sea Operators low figure of only 0.46% is explained by the expedient of 'importing' previously trained contract personnel. However, the very large spread of training percentage figures, up to as high as 24%, is surprising and with no obvious explanations. The most likely explanation is 'faulty' reporting such as inclusion of trainer hours along with trainee hours, contrary to reporting requirements. If so, in one case, this could have amounted to about 100,000 'excessive' training hours being recorded.

It may be of interest to compare RAC data for 2017 and 2018, accepting that the introduction of a further RAC will compromise some figures. Inspection of the data, summarised in **Table 5** for employment and work hours, shows modest increases for most RACs. (Increases are shown shaded in green, reductions shaded in pink).

Significant increases in both employment and associated work hours were recorded for MECASA, North America and the UK. The only significant reduction in both employment and work hours was in South East Asia and Far East. Items shaded in yellow are the newly introduced Eastern Europe and, probably depleted as a result, 'Other', as may be assumed by the collective totals.

Previous reports have presented more detailed charts and data for each individual RAC. This process is abandoned for report brevity, relying on the summary data provided in the tables above. However, individual RAC reports of details may be prepared on request.

Table 3 • 2018 RAC Work Hours by Location

RAC	Onshore on ropes	Onshore other	Offshore on ropes	Offshore other	Training
Australasia	944,890	400,031	141,484	170,827	34,475
Benelux	159,325	128,403	120,325	39,904	10,578
Brazil	70,116	63,265	196,479	41,439	116,862
D-A-CH	21,993	36,654	0	0	2,510
Eastern Europe	63,380	145,556	23,586	66,105	42,682
Mediterranean	74,940	80,004	6,648	3,673	23,675
MECASA	1,498,569	1,611,423	282,804	392,110	57,341
North America	544,115	531,878	40,000	38,595	45,057
North Sea Operators	200,500	444,917	938,303	1,552,835	14,444
Other	72,365	288,260	454,129	467,142	51,612
Scandinavia	66,607	53,080	38,929	19,398	2,563
South Africa	26,088	181,611	75,622	136,793	16,355
SEA & FE	346,268	506,453	323,110	285,702	56,019
United Kingdom	1,553,443	1,006,281	1,500,601	923,222	86,561
Total	**5,642,598**	**5,477,816**	**4,142,020**	**4,137,744**	**560,733**

Table 4 • 2018 RAC Training Percentage of Work Hours

RAC	Training	Total hours	% Training
Australasia	34,475	1,691,707	2.04
Benelux	10,578	458,535	2.31
Brazil	116,862	488,161	23.94
D-A-CH	2,510	61,157	4.1
Eastern Europe	42,682	341,309	12.51
Mediterranean	23,675	188,940	12.53
MECASA	57,341	3,842,246	1.49
North America	45,057	1,199,645	3.76
North Sea Operators	14,444	3,150,999	0.46
Other	51,612	1,333,508	3.87
Scandinavia	2,563	180,577	1.42
South Africa	16,355	436,469	3.75
SEA & FE	56,019	1,517,552	3.69
United Kingdom	86,561	5,070,108	1.71
Total / Average Percentage	**560,733**	**19,960,912**	**2.81**

Table 5 • RAC Comparisons 2017 / 2018

RAC	Average Employed		Work Hours	
	2018	2017	2018	2017
Australasia	1,566	1,472	1,691,707	1,461,456
Benelux	486	469	458,535	393,088
Brazil	730	752	488,161	507,760
D-A-CH	46	54	61,157	52,159
Eastern Europe	432	xxx	341,309	xxx
Mediterranean	208	146	188,940	142,351
MECASA	2,139	1,662	3,842,246	3,152,278
North America	1,278	793	1,199,645	867,241
North Sea Operators	2,234	1,966	3,150,999	2,514,336
Other	894	1,450	1,333,508	1,664,412
Scandinavia	225	244	180,577	261,702
South Africa	321	286	436,469	364,709
SEA & FE	1,567	2,072	1,517,552	2,321,930
United Kingdom	4,503	4,167	5,070,108	4,478,654
Total	**16,626**	**15,531**	**19,960,912**	**18,182,076**

4. ACCIDENT AND INCIDENT STATISTICS

4.1 INTRODUCTION

Before addressing the accident and incident data, it should be noted that, unfortunately, only the immediate outcome of accidents and incidents is usually considered. However, any and every accident or incident will have potential lessons to be learnt, irrespective of outcome. Thus, even an apparently minor 'Incident', if properly investigated, may reveal serious underlying problems, concerns or lessons to be learnt, not only for the individual member but for the organisation and industry as a whole. In the absence of such information, the report must rely on the outcome data, as supplied in summary form.

(See **Appendix II** for explanations and descriptions of terms used for 'Fatality', 'Major Injury', 'Serious' or 'Over 7 Day Injury', 'Minor' or 'Less than 7 Day Injury', 'Incident' or 'Near Miss', 'Ill Health', 'Sprains / Strains' and 'Reportable Accident').

4.2 CONSEQUENCES OF ACCIDENTS AND INCIDENTS

A total of **166** acceptable reports were received. Within this total were **65** reports of **actual injuries or illnesses**. The five **'Reportable Accidents'** are shown in the table below alongside those for 2016 and 2017. Clearly, a significant reduction in 'Reportable Accidents' were recorded in 2018, noting particularly the absence of any fatality. No job, however important, can ever be worth loss of life.

	2018	2017	2016
Fatal	**0**	3	1
Major	**1**	1	4
Serious	**4**	9	4

Turning now to less serious accidents and incidents, the table below summarises the data for 'Less than7 Day Injuries' / 'Minor Injuries', instances of Illness, Sprains/Strains and 'Near Misses' or non-injurious incidents:

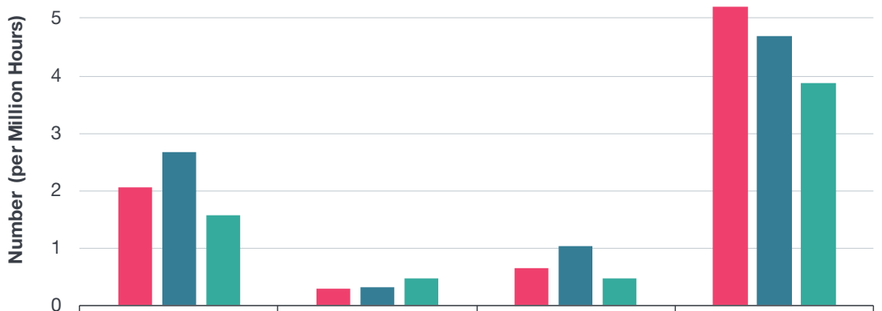
	2018	2017	2016
< 7 day*	**41**	49	29
Illness	**6**	6	9
Sprain / Strain	**13**	19	9
Near miss	**101**	86	71

* Excluding Illness and Sprains/Strains

The most positive result is an **increase in 'Near Miss'** reporting, albeit still well below that expected from a working population of ~16,000 and associated 20 million work hours. 'Minor Injuries' or 'Illnesses' requiring less than 7 days away from work included 6 instances of being taken ill and 13 various 'Sprains or Strains'. In many cases, 'Minor Injuries' were not accompanied with time lost reported being relatively trivial. The table does not take account of differences in the annual 'populations' from one year to the next. The chart below (**Fig 5**) takes the number of events and divides them by the working hours recorded for each year to allow direct comparisons with previous years.

A modest increase in 'Near Miss' reporting was apparent, but is still only about 5 reports per million hours of work and well below that expected.

Fig 5 • Events per Million Work Hours



	< 7 Day	Illness	Sprain/Strain	Near Miss
2018	2.05	0.3	0.65	5.2
2017	2.68	0.33	1.04	4.7
2016	1.58	0.49	0.49	3.86

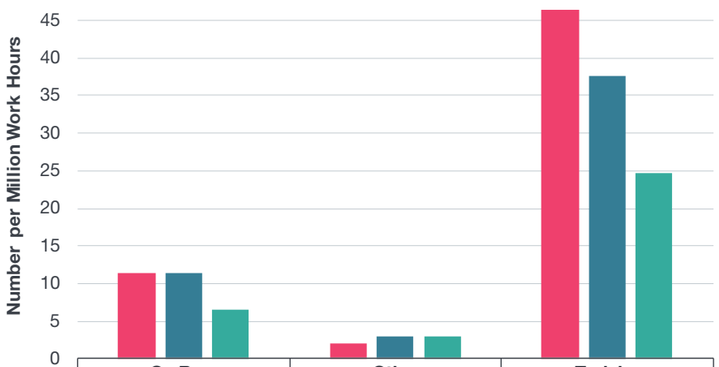
4.3 LOCATION OF ACCIDENTS AND INCIDENTS

All 166 'events' reported are tabulated below according to location of where they occurred, alongside similar data for 2016/7 (noting that 'Off Rope' and 'Other' are combined):

	On Rope	Other	Training
2018	**111**	29	26
2017	**104**	26	18
2016	**61**	25	12

The significant increase in reporting ‘On Rope’ events is evident as is the increase in training events. However, again, the figures do not take into account the hours ‘at risk’ or ‘exposure’. Not surprisingly, the majority of reports relate to ‘On Rope’ working. However, dividing each number by the work hours enables comparisons to be made, as shown in the chart below (**Fig 6**).

Fig 6 • Location of Events



	On Rope	Other	Training
2018	11.35	1.98	46.4
2017	11.4	3	37.5
2016	6.63	3	24.6

The immediate assumption from the chart is that training is about four times more ‘risky’ than ‘On Rope’ working, and almost double that reported two years previously. However, this must be tempered by three factors.

Table 6 • Summary of Accident Numbers

	Major	Over 7 day injury	Less than7 day injury	Illness	Strain / Sprain
On Rope	0	4	30	2	4
Other	1	0	8	1	5
Training	0	0	3	3	4

* Excluding Illness and Sprains/Strains

Firstly, training (and assessment) must, by its nature, involve trainees undertaking difficult exercises and relatively complex manoeuvres. Secondly, training establishments are probably more aware of the value of reporting events beyond usual trainee or novice errors/omissions. Thirdly, when the accident data is examined (see later), of the 26 events reported during training, 16 were ‘Near Misses’, 3 were illnesses, 4 were ‘Strains or Sprains’ and only 3 were other ‘Minor’ injuries, as shown in the summary **Table 6**, noting the absence of any ‘Reportable Injuries’. It is fortunate that no serious injuries were sustained during training but the minor injuries and illnesses serve as a reminder of the need to maintain close supervision.

Image courtesy of Never Let Go © 2019 www.neverletgo.uk

It may be of interest to trainers to note that of the 16 ‘Near Misses’, 5 were due to dropped rope devices, 5 were down to errors, omissions or confusion during casualty rescue and 4 were instances of single point or unattachment.

The 101 ‘Near Miss’ reports, in which no injury occurred, were distributed as follows:

71	On Rope	(7.3 per million work hours)
14	Other	(1.5 per million work hours)
16	Training	(29 per million work hours)

Thus, pro rata to work hours, training reported four times more incidents than ‘On Rope’. This is not surprising as explained earlier. Unlike actual injury events, ‘Near Miss’ or ‘Incident’ reports are encouraged and welcomed.

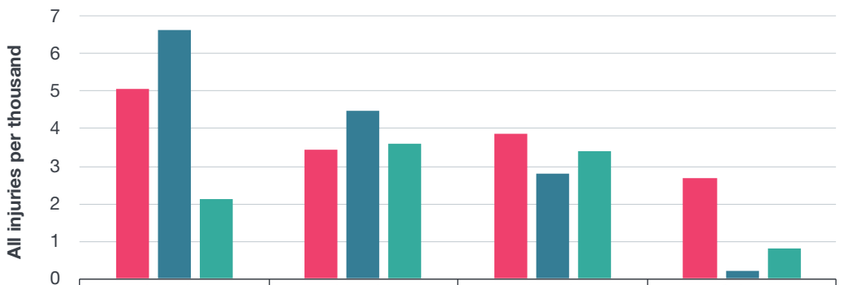
4.4 ACCIDENT EVENTS BY GRADE

Since injuries relate to individuals, the following section is based on actual numerical employment rather than hours worked. **Fig.7** shows the rates of injury for each Level or grade, excluding managers (nil), for all injuries. It is emphasised that the chart includes all injuries, irrespective of seriousness. The data was obtained by dividing the actual number of injuries sustained by each Level or grade, by the average population for each Level or grade. This again allows differences in population of the grades, and between annual variations, to be taken into account.

The chart shows a modest increase in injurious accidents suffered by Level 1 technicians, and small falls in Level 2 & 3 injuries (per thousand). However, the injury numbers involved remain statistically small, typically only about 20 per grade. Thus, variations in the chart may be exaggerated by modest changes in reports. For example, the significant increase in injury rate to ‘Other’ grade workers may be noted but, in reality, only 4 minor injuries were actually sustained by the ~1,500 ‘Other’ workers.

The single ‘Major’ injury was sustained by a Level 1 technician off rope and falling, apparently, unrestrained or with ineffective fall restraint. At time of writing, the circumstances of the accident were still under investigation.

Fig 7 • Injuries by Grade



	Level 3	Level 2	Level 1	Other
2018	5.17	3.44	3.88	2.7
2017	6.68	4.49	2.82	0.22
2016	2.12	3.61	3.4	0.81

4.5 BODY PART INJURIES

Fig 8 shows the distribution of reported ‘injuries’, sustained in 2018, alongside those for the previous two years. Stomach injuries (nil for all three years) are omitted from the chart.

Hand/finger injuries (14) fell significantly from the 2017 figure of 20. 6 cuts, or damage, to hands were caused by tools being handled (e.g. knife, hacksaw, grinder, mattock). A further 6 hand injuries were caused by pinching or trapping with a variety of tools and materials. 2 sprains or strains occurred from adjusting a strap and the second happened when an outstretched hand during a fall to the ground slipped on a grape, adding an additional injury to a pre-existing injury.

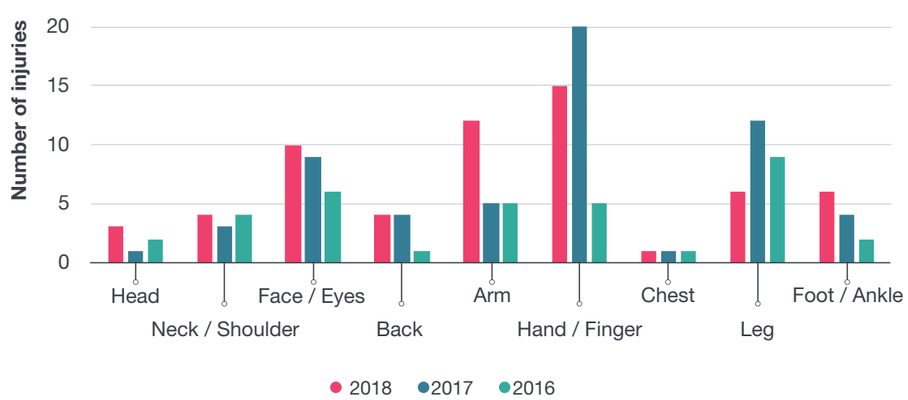
Injuries to the arms (12) were caused by dropped or falling objects (2), burns from contacting hot surfaces (2), chemical contamination (3 in a single accident), impacting structures/stairways (4) and a pulled muscle strain. 6 facial injuries were caused by 3 strikes from rope work devices, a block of dislodged ice and, in one case, a knife. The sixth facial injury was one of several injuries incurred during a ‘Major’ injury fall through an atrium roof. Dust or debris (grinding splinter) entering eyes accounted for the only two eye injuries reported, a significant improvement over previous years.

2 of the 4 neck/shoulder injuries were caused by muscle strains, as was the single chest injury. A third neck injury was caused by a burn from contact with a hot pipe. A fourth injury was from being struck by a plug ejected under pressure striking a shoulder. 2 back injuries were strains (lifting and throwing). A sliding fall and impact from a dropped scaffold pole were the other two causes of back injuries.

The 6 leg injuries were due to welding burns, a short fall on a dislodging belay allowing impact of a knee on steelwork, a scraped shin during a slip, impact from a dropped box, and from slipping. 2 of the foot injuries were also caused by hot metal burns. A third injury was a result of a falling bar striking the foot. A fourth was a twisted ankle from tripping over a shoelace, compounded by an extensive period recovering from a post event hospital induced infection, the result of which is excluded from this analysis. The chart excludes one accident involving accidental swallowing of thinners, fortunately with no long term ill-effects.

Finally, it may be noted that 44 of the 60 injuries were due to personal error, i.e. were ‘self-inflicted’, a direct consequence of an individual’s actions or omissions.

Fig 8 • Body Part Injuries



↑61%

EMPLOYED SINCE 2017
(North America RAC)

↑38%

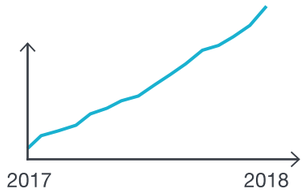
WORK HOURS SINCE 2017
(North America RAC)

↓24%

EMPLOYED SINCE 2017
(South East Asia & Far East RAC)

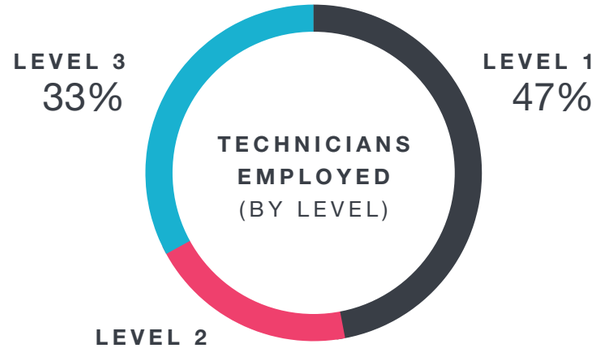
↓34%

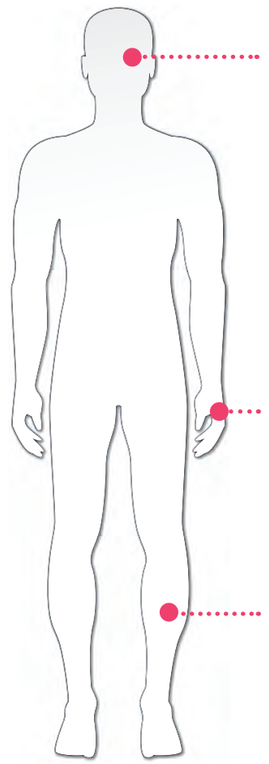
WORK HOURS SINCE 2017
(South East Asia & Far East RAC)



14%

INCREASE IN MEMBERSHIP





2 EYE INJURIES

significant improvement over previous years.

15 HAND INJURIES

fell significantly from the 2017 figure of 20.

6 LEG INJURIES

a scraped shin during a slip and impact from a **dropped box**.

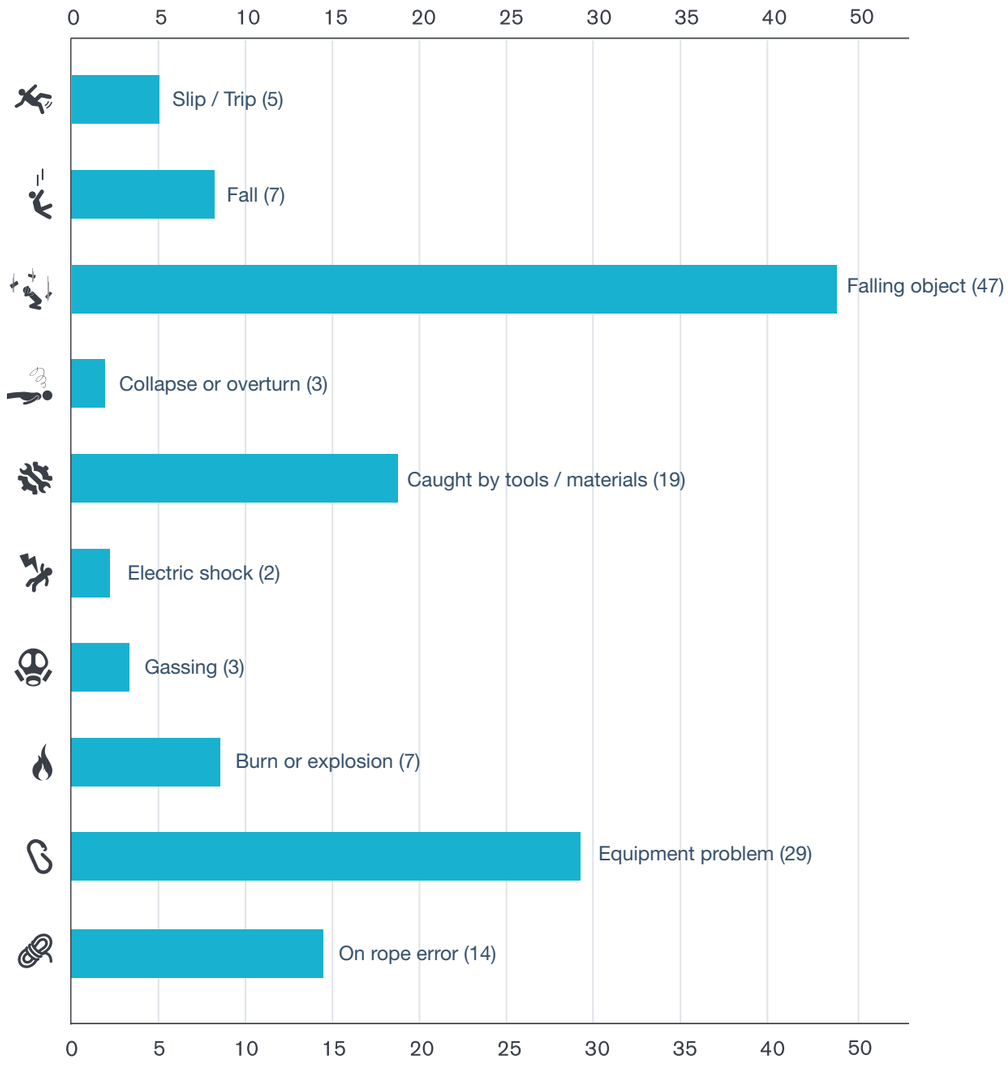
4.6 CAUSES OF ACCIDENTS AND INCIDENTS

Only the categories that most closely describe the immediate cause of an accident or 'Near Miss' were submitted in the reports. It is fully acknowledged that this is a serious weakness of this data analysis. The data provided frequently did not identify true root causes. **Fig 9** presents the data supplied, amended and corrected, when necessary, to comply with reporting requirements.

The most common cause of reports was 'Falling objects', which was significantly greater than in previous years. In view of the number, it is perhaps worth analysing the 47 events in more detail. Rope access workers were directly responsible for 37 of the dropped objects. Tools were dropped 15 times and rope access devices 8 times. In most cases of the dropped tools, lanyards were either detached or were ineffective. Is this a potential tool box check item? In 12 cases, items or materials were dislodged and fell. 3 cases were related to third party acts or, in the case of 2, omissions. These were an unsecured grating and a loose bolt.

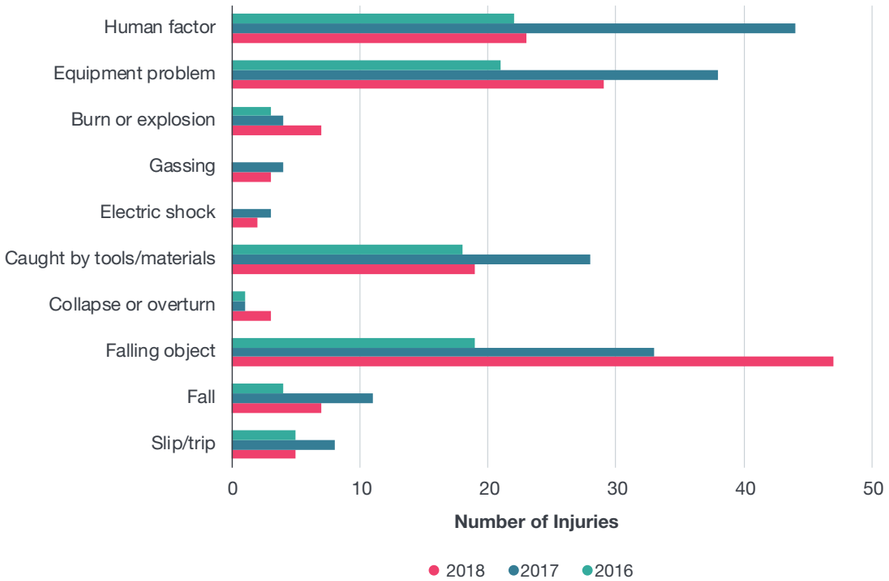
Dropped objects ranged from drills, grinders, inspection equipment, bolts, bars, a light unit, a radio, a scaffold pole, a clamp to an ice block, and a mask as well as the various rope access devices. There were 7 injuries involved in dropped or falling objects, fortunately none were serious including the impact on a technicians back from a falling scaffold pole.

Summary of Causes of Events Reported in 2018



NOTE: Before considering the data, it is necessary to provide an explanation of some factors:
Fall & Slip/Trip – Conventionally, falls include slips and trips. A distinction between slips/trips and actual falls is more appropriate in this particular industry, hence, they were separated in this analysis.
Equipment problems – Mainly relates to rope-work equipment and includes rope damage, but other work equipment failures were also included.
Human Factor – Frequently identified but here limited to acts for which there was no other cause or explanation. For example, a dropped object would not be ascribed to human factor whereas illness or a pulled muscle would be if no other immediate cause was identified.

Fig 9 • Immediate Cause of all Events Reported



Equipment problems included 29 items, one of which was a single event involving an ejection of a plug under pressure causing 2 injury reports. 12 reports detailed defective, or apparently defective, rope access devices, with some members reporting the defects to manufacturers/suppliers. Failure of third party equipment led to 5 reports.

There were 8 instances of rope damage or severance, including an instance of accidentally damaging their own rope with a scraper tool. Several failures to recognise threats to ropes were also reported, including one caused by glassy clinker deposits inadequately cleaned from plant pipe work. More positively, there were two reports of potential threats to ropes that were recognised before any damage was actually done. A set of ropes were deliberately cut by a third party. In 2017 there were 18 instances of rope damage reported, including several complete severances, so these results, worrying as they were, are a significant improvement.

It may perhaps be of small consolation to the family and friends of those who lost their lives due to rope failures that greater emphasis now appears to be paid to rope protection and inspection. It is hoped this trend continues in the future.

Human Factors were also involved in 23 reports nearly half of which (14) were due to ‘On Rope’ errors or omissions. Six occurred during training and were considered sufficiently serious to be reported. Detachment or lack of attachment explained two reports. There were three site reports of poor rigging practice by Level 3 technicians and one case of a Level 3 leaving the work site whilst work was underway. Illness or muscle strain accounted for a further seven reports, three of which occurred during training. Self-inflicted injuries or strains/sprains were reported in nine cases, six of which were caused by slips or trips, three on ropes, leading to minor injuries.

Three of the reported seven ‘burns’ were caused by hot metal or weld spatter lodging within clothing or footwear. A further three were minor burns from contact with hot pipes. In one case, a smouldering fire was caused by ignition of cladding during drilling operations. ‘Gassing’ was reported in three incidents, one incident involved diesel fumes affecting three workers. Another report involved a plant suddenly emitting gas vapour and liquids that enveloped a worker. The threat of a steam release caused work to cease in one further report. A possible fourth report, which led to temporary unconsciousness, may have been due to fume release but was not recorded as such.

One reported incident of a ‘Collapse’ involved a loose manhole cover stepped on but without injury. The second involved an unclipped grating giving way when stood on, leading to a 1.5 m fall. Both instances of electric shock were minor events. Although not strictly a ‘Collapse’, a third event concerned a compressor that began emitting excessive noise and vibration following a severe earthquake. A technician working in the close vicinity was forced to withdraw rapidly from the area.

Of the seven falls, three were 1-1.5 m falls due to a slipped anchor point. One ‘fall’ was a slide when detached from ropes. Two short drops of 15 and 25 cm occurred during training rescue exercises. The other falls were due to grating giving away (as above) and tangled ropes during descent. Although all the above were relatively minor, in terms of outcome, one fall ended in serious injuries. A worker stepped through an opening left by an absent glazing panel on an atrium roof that he was cleaning. He fell 6 meters. It is unclear what the status of his fall arrest system was, but, if present, it was apparently inadequate to protect him. No further information was available.

Before moving on from the ‘Cause’ of accidents and incidents, it is worth noting that, by inspection, 23 reports appeared to involve third party interactions in one form or another. In five cases isolation failures and plant interruptions affected work (diesel leak, steam, pressure plug failures, remnant oil leak). In other cases, a lack of communication caused problems, such as unexpected crane movements and angry building occupants remonstrating with rope access workers as they passed by on rope. Four cases were reported involving failure to prepare the site adequately (glassy clinker deposits, loose grating), supplying faulty or ineffective equipment (hoses and a gas monitor) and leaving powder deposits causing a rash on three workers. However, potentially the greatest concern were three reports of ropes deliberately interfered with, including cut ropes noted earlier, and disconnected rigging. Site protection should be a shared responsibility with the site ‘controller’.

One final point that must be made is that the number of ‘Near Miss’ reports should not be used as a criterion of performance. For several successive years members have been urged to increase the number of ‘Near Miss’ reports. These provide useful data for proactive assessment of work errors and omissions, and provide the basis of recommendations for improvement. Therefore, it would be counterproductive to then use this numerical data provided in a negative appraisal of performance.

Image courtesy of Applus © 2019 www.applus.com

4.7 OTHER FACTORS

Weather of working conditions
Only six reports indicated that working conditions had a significant influence. Buildup of ice on a pipe deck needed to be removed, during which a technician was struck by a dislodged falling block of ice. Hot sunny conditions caused an incidence of dehydration/heat stroke. Similarly, working in a tank led to a case of heat exhaustion due to high ambient temperatures. There were two reports of high winds causing problems. Firstly, a panel, whilst being lowered, swung and narrowly missed a technician. In the second instance, wind 'suddenly' increased forcing a technician to descend and lower himself into a safety boat instead of climbing back up his ropes.

Rescue
The need for a rescue was reported in nine cases. Four of these rescues occurred to trainees on ropes. Of these four cases, three were taken unwell and were either lowered or rescued. The fourth, during rescue training, lost control and needed help.

Two technicians had to be extracted from a height of 12 meters within a concrete sewage well, and a similar event required the rescue of a Level 1 technician from a height of 6 meters within a well. Painting, in hot conditions, on a stadium roof under construction led to a technician needing to be lowered, via pre-rigged rescue ropes, as they were suffering from heat stroke. As above, a technician caught in sudden high wind conditions was unable to ascend his ropes and had to descend, and be taken off ropes in a safety boat. Finally, the technician escaping from the previously described compressor incident following an earthquake, in haste, ended up suspended by his taught cow's tail attached to an anchor. The cow's tail had to be cut to allow him to descend and escape the area.

4.8 TIME LOST

Of the 65 reported injuries and illnesses only 16 cases reported time off work. Reported days off work for injured persons totalled only 54 days, or less than 1 day per event on average. Even adding in the 34 days for time lost by 'Others' associated with accidents, and accepting that there may be some additional time off work for longer term injuries, there is little point in comparing data with the UK, Eurostat or US BLS data in view of the apparently major under reporting of time lost.
For example, the UK Labour Force Survey figure for 2017/18 records 1.17 days lost per worker for all illnesses and injuries and 0.15 days lost per worker for injuries only.

The equivalent injury time lost for ~ 10,000 full time workers, as here, would be ~1,500 days. If illnesses are included, the figure rises ten-fold. Why rope access workers, historically, record such little time lost following an accident is not known, except perhaps to suggest that it relates to the nature of the workers involved (age range, resilience and general fitness).

http://www.hse.gov.uk/statistics/lfs/index.htm - and view tables LFSWDL & LFSINJSUM

4.9 SUMMARY OF ACCIDENT DATA

The total number of acceptable accident and incident reports submitted for 2018 was 166. Actual injuries totalled 65, of which 5 were reportable (1 'Major' and 4 'Serious' or 'Over 7 Day' injuries). The remaining 60 were 'Less than 7 Day' injuries that included 13 'Strains/Sprains' and 6 'Ill-health' issues. Reports of various 'Near Misses' totalled 101.

5. COMPARISON OF ACCIDENT DATA

5.1 BASIS FOR COMPARISON

Conventionally, accident statistics are based on accidents per 100,000 workers. Thus, it is necessary to convert actual accident numbers to an equivalent workforce of 100,000. To maintain a pessimistic analysis, a workforce corresponding to the hours worked will be used, i.e. full time employed. This is 20.0 million hours / 2,000 hours per person per annum = **10,000**, considerably less than the reported workforce of over 16,636. The 'multiplication factor' per accident becomes 100,000 / number of full time workers = 100,000 / 10,000 = **10.0 per accident**. This figure is the multiplication of any single event for a workforce of 100,000. The accident rates in 2018 then become:

Major injuries 1 x 10.0 = 10 per 100,000
Over 7 Day Injuries (Serious) 4 x 10.0 = 40 per 100,000

Thus, the total for combined reportable injuries was 50 per 100,000 workers.

Fortunately, no fatalities were reported in 2018. However, it has been the custom to take a five year time period in assessing fatality rates. Hopefully, by retaining this practice, the need for sustained vigilance by all involved in rope access will be maintained. A reminder of previous fatalities will not be required the by the family and friends of those who lost their lives.

The legacy of the three fatalities in 2017 has to be taken into account despite the fact that no fatalities were reported in 2018. Fatalities also occurred in 2015 and 2016. Thus, over the five year period of 2014-2018, the total of five fatalities in a 'working' population of about 50,000 full time equivalent workers (about 100 million accumulated hours), gives a fatality rate of **10 fatalities per 100,000 workers**. This figure will be included in the data comparisons that follow.

5.2 COMPARISON AGAINST UK, EU AND USA DATA

Differences in data collection between the various agencies requires each to be considered separately, with the need for IRATA to adjust data accordingly. The UK Health and Safety Executive (HSE) provisional figures for 2018 for employees in selected industries, found on their website, are tabulated (**Table 7**) together with equivalent IRATA figures. The HSE accept that its figures may be approximately 50% under-reported.

Table 7 • Accident Rates v UK HSE 2018 Data

Industry	Fatalities	Major Injury	Over 7 days injuries	Total (excludes fatalities)
Agriculture, forestry, fisheries	8.44	198	277	475
Manufacturing	0.52	102	361	463
Construction	1.64	133	225	358
All industries	0.45	68	195	263
IRATA	10*	10	40	50

(All figures, except fatalities, are in rounded numbers of injuries per 100,000 employees)
*5 year average
http://www. hse.gov.uk/statistics/tables/index.htm (e.g. See Table RIDHIST and RIDHIND - 2017/18)

The overall IRATA injury rate is only ~ 20% of the UK 'All Industry' rate. If the HSE under-reporting is taken into account, it falls to only ~10%, which is a further improvement on the 2017 figures. However, the historical 5 year fatality rate, though considerably reduced by the absence of any fatalities in 2018, remained higher than the HSE annual rate.

EUROSTAT's latest figures are for 2016 and are based on 'Over 4 Day' injuries. Therefore, in order to compare data, it is necessary to extract those accidents that approach the '4 days or more off work' criterion. The number of injuries that required 4 or more days off work was 5, with no additional injuries above 'Major' or 'Over 7 Days'. Thus, maintaining the rate at 50 injuries per 100,000. This figure may now be compared to the EU 28 2016 figures, noting the large range of figures supplied by individual member states:

Table 8 • Accident Rates v Eurostat 2016 Data

Industry	Fatal	Range of fatal injuries	Over 4 days injuries	Range of injuries by country
Agriculture, forestry, fisheries	6.09	0.2 - 33.5	2,011	44 – 4,885
Manufacturing	1.69	0.7 – 5.5	1,952	117 – 4,324
Construction	5.8	1.0 – 17.9	3,010	213 – 6,604
All EU industry	2.21	0.71 – 10.8	1,513	76 – 3,589
IRATA	10*		50	

(All figures injuries per 100,000) *5 year average

https://ec.europa.eu/eurostat/data/browse-statistics-by-themes
https://ec.europa.eu/eurostat/web/health/data/database
(The folder containing data is under: Database by themes: 'Population and social conditions': sub-folder of 'health': sub folder 'Health and safety at work (hsw)': sub-folder of 'Accidents at work (hsw_acc_work): sub-folder (hsw_mi): sub-group (hsw_mi01) and other tables).

The IRATA rate for all injuries 'Over 4 Days' was only ~3% of the average 'All EU-28' figure for 2016. However, the five year fatality rate remains above the EU 'All Industry' rate, but the gap narrowed as a result of the fatality free year and now falls well within the range of individual Eurostat contributors. The injury rate (50 per 100,000) does line up with the very lowest figures for some individual EU countries, but these must be considered extremely low in relation to the more typical figures represented by the overall average of ~1,500 injuries per 100,000.

Comparing IRATA data to USA data is difficult due to differences in the way injuries and illnesses are defined and classified. The table below presents some injury and illness data presented by the US Bureau of Labor for 2017. The US data is also based on full-time workers working 2,000 hours per annum, and hence is comparable to those in this report. BLS data includes all accidents and illnesses requiring any days off work. Therefore, it is necessary to select all injuries and illnesses that reported any time off work.

It was previously noted that a degree of under reporting of time off work within the IRATA data was suspected. However, taking the data as supplied, only 16 accidents or illnesses recorded time off work, giving a rate of 16 x 10 = 160 injuries/illnesses per 100,000. This figure is added to the BLS summaries in the following table (all figures are per 100,000 workers):

Table 9 • Accident Rates v USA BLS 2017 Data

US private industry sector	Fatalities	Non fatal injuries and illnesses with days away from work (private industry)
Agriculture, forestry, fisheries	23.0	1,705
Manufacturing	1.9	930
Construction	9.5	1,247
All private industry	3.5 (13.1 self employed, 2.9 wage earners)	894
IRATA	10*	160

*5 year average

(https://www.bls.gov/iif/osch0062.pdf)
(https://www.bls.gov/web/osh/cd_r5.htm)

The IRATA figure for all injuries and illnesses was below all US BLS figures, approximately 18% lower than the 'All private industry' rate. This is even lower than the previous two years. The IRATA five year average fatality rate had fallen relative to the BLS 'All industry' rate, and is falling within the ranges for related industrial sectors. Even if every single injury/illness, no matter how trivial, were included (65 giving 650), it would still be below the 'All private industry' rate.

5.3 WORKING 'ON ROPE'

There is significant interesting data in the specific 'On Rope' working injury reports. The number of all injuries, instances of ill health and strains/sprains during 'On Rope' working was:

- 'Over 7 Day Injury' 4
- 'Less than 7 Day Injury' 36 (Includes 4 strains/sprains and 2 ill health)
- TOTAL All Injuries 40

The total hours worked 'On Rope' was 9.785 million hours. Thus, the accident rate is given by total injuries x 100,000 / total work hours 'On Rope' = 40 x 10^5 / 9.785 x10^6 = 0.409 injuries per 100,000 hours. Converting to 100,000 full time equivalent workers (at 2,000 hours per worker per annum) gives 818 per 100,000 workers. A similar calculation for the four reportable accidents gives a rate of 82 per 100,000 workers. A graphical presentation of the accident rate per year is shown in **Fig 10**.

The table in **Appendix I** was extended to include the above figures. Although there is a small increase in the 'All Accidents' figure, the 'Reportable Injury' rate for work 'On Rope', returned to pre-2017 levels. It must be emphasised that the graph is based solely on accidents that occurred whilst 'On Ropes'. Comparison with other sources of 'Reportable' data can only be made based on the blue line in **Fig 10**.

Fig 10 • On Rope Accidents 2007 - 2018

5.4 ACCIDENT AND INCIDENT DATA AND REGIONAL ADVISORY COMMITTEES

No attempt is made to apportion accident or incident data to RACs for the following reasons:

- RACs operate under differing conditions, environments and circumstances;
- ranking could lead to competitive attitudes and result in temptation to withhold submissions, particularly the incidents where most data resides and finally but, most importantly,
- the low numbers of accidents and incidents reported, if distributed between 14 RACs, would give virtually meaningless statistics.

6. SUMMARY

Membership and Employment

- Membership rose to **443 members** by December 2018 from 389 in 2017.
- Average employment per quarter increased from 15,530 to **16,626**.
- Total work hours increased to nearly **20 million hours**, including training.
- Training accounted for 0.56 million hours, 2.8% of all hours.
- Hours spent 'On Rope' rose nearly 8%, from 9.1 to 9.8 million.
- Hours spent working onshore was 11.1 million and 8.3 million offshore.

Regional Advisory Committees

- Contributions from the 14 RACs varied from 46 to 4,500 employees.
- Contributions to work hours varied from 61,000 to 5.1 million per RAC.
- Eight of the RACs reported increases in both employment and work hours.

Accident and Incident Reports

- Accident and incident submissions totalled 166; they were distributed as follows:
  * Nil Fatalities
  * 1 Major Injury
  * 4 Serious injuries (Over 7 Day Injuries)
  * 60 Minor injuries (Less than 7 Day Injuries)
  * 101 Near Misses

- 'On Rope' working accounted for the four 'Serious' and 36 'Minor' injuries.
- The highest 'accident' rate, on a 'time at risk' basis, continued to be training but all ten injuries or illnesses incurred during training were 'Minor'.
- Injury to Level 1-3 technicians averaged about 4 per thousand for all injuries.
- Of the 60 individual body part injuries reported, 44 were 'self-inflicted' by technicians.
- Improvements were found in:
  * a reduction in hand injuries;
  * a reduction in eye injuries;
  * a reduction in instances of rope damage (from 18 to 8) and no damage caused by power ascenders;
  * rope protection measures including identification of potential threats to ropes;
  * the identification of defective rope access devices, possibly indicating improved inspections.

- Areas of concern identified included:
  * dropped objects (47); 37 of which were items dropped by technicians.
  * 12 incidents, or accidents, followed dislodgment of items or materials on site;
  * 23 occasions of third party involvement in reports, including problems encountered with inadequate site conditions and preparation, communications, protection and failed or inadequate isolations.

Comparison of Accident Rates with All Industry Data

- The reportable injury and illness rate of 50 per 100,000 workers remained well below all international statistics for reportable injuries, being between 3 - 20% of all latest comparable accident rates provided by national agencies.
- No fatalities were sustained in 2018, allowing the five year rate to fall to 10 per 100,000 and be within upper rates reported elsewhere.

Image courtesy of MIRA Rope Access © 2019 www.mira-ra.com

7. CONCLUSIONS

The following conclusions are based on examination of the employment data and the accident and incident reports supplied by member companies during 2018:

1. Members of the Association should be congratulated on an excellent year in terms of the accident rate reported. The reportable injury rate of only 50 per 100,000 full time workers confirmed an excellent safety record for 2018 being between 3-20% of 'all industry' international figures.
2. As a result of the absence of any fatality in 2018, the five year fatality rate fell to within the upper levels of international statistics.
3. The highest injury rate, on a 'time at risk' basis, was sustained during training although only 'Minor' injuries were reported. Reportable injuries 'On Rope', in isolation, remained very low and well below international statistics.
4. Several areas of improvements over previously reported accidents and incidents were observed, particularly significant was the reduction in instances of rope damage.
5. Reported 'Near Misses' increased but remained well below that expected for 20 million work hours.
6. A number of areas of potential concern were highlighted from the accident and incident reports. These included:
    - dropped tools and equipment due to failure, or absence, of tethers or lanyards;
    - third party interactions and failures, leading to hazardous conditions;
    - failure to identify and protect against site hazards.

8. RECOMMENDATIONS

- The following recommendations are made, based on reports received:
- Pre-work checks should pay particular attention to:
    a. **identification of potential site hazards** including loose, unstable or uncertain site conditions and potential threats to both technicians and ropes, e.g. hot pipes / surfaces;
    b. **clarity of communications** with all site third parties, with emphasis on the need for isolations and adequacy of site preparations required prior to the undertaking of work (depressurisations, drain down, integrity of plant and structures);
    c. **protection of work sites** from third party intrusion or interference with rope access rigging;
    d. **all work tools and equipment** to be used whilst on rope are fit for purpose and **are adequately tethered** at all times;
    e. **reminding** all technicians to take special care using tools to avoid self-inflicted injuries (1 in 4 reports involved self-inflicted injuries).
- The IRATA Executive should congratulate Members on the excellent accident statistics for 2018, but should continue to encourage the membership to report, not only injuries, but all incidents that could have led to an injury or fatality i.e 'Near Misses'.

ACKNOWLEDGMENTS

The assistance of IRATA staff in compiling, arranging and presenting data is gratefully acknowledged. Also recognised is the considerable effort of member companies' staff who produce and submit the data required. This report could not be prepared without their collective effort.

This report contains public sector information published by the UK Health and Safety Executive and licensed under the Open Government Licence. Also acknowledged is the information made available by Eurostat and US BLS.

Appendix I • Accident Rates for 'On Rope' Working 1989 - 2018

Year	No. of Members	Work hours on ropes	No. not reportable accidents	Reportable accidents	Reportable accident rate ***	Rate for all accidents ****
1989	9	267,504	8	0	0	6000
1990	12	327,645	7	0	0	4260
1991	16	457,928	17	0	0	7420
1992	22	537,920	13	1	380	5200
1993	23	327,000	21	0	0	12840
1994	32	348,749	11	0	0	6300
1995	32	484,285	16	0	0	6620
1996	26	559,035	18	2	720	7160
1997	31	699,688	11	9	2580	5720
1998	37	1,006,538	23	10	1980	6600
1999	33	803,365	29	3	740	7980
2000	34	887,206	21	3	680	5420
2001	49	999,010	25	4	800	5800
2002	49	1,225,930	12	0	0	1960
2003	56	1,634,482	9	0	0	1100
2004	67	1,457,848	22	1	140	3160
2005	81	2,311,265	10	3	260	1120
2006	95	2,132,141	21	1	100	2060
2007	130	2,765,483	21	2	140	1660
2008	149	3,859,584	25	8	420	1700
2009	170	4,582,642	15	14	660	1260
2010	184	5,247,365	18	4	160	840
2011	217	5,209,056	17	5	200	840
2012	247	5,655,637	19	4	140	820
2013	277	7,012,270	28	3	86	880
2014	315	7,591,977	16	5	132	560
2015	333	10,096,489	25	3	60	560
2016	353	9,232,382	13	4	87	368
2017	389	9,124,565	28	8	175	789
2018	443	9,784,618	37	4	82	818
TOTAL		**96,629,607**	**556**	**101**		

Based on 2,000 hours per person per annum

* Units for Accident Rate (AR) number per 100,000 workers

** Column 5 divided by col 3 (x 2000 x 100,000)

*** Column 4 + 5 divided by col 3 then x 2000 x100,000

Appendix II • Glossary of Terms Used

Throughout the report, reference is made to the following categories of work location:

'On Rope' – Arranging, using and directly involved in rope access work. It also includes access and egress activities to rope access work sites and setting up belays, rigging and de-rigging. Thus, this does not necessarily require a person to be 'roped up' or physically connected to active ropes.

'Other' – Typically includes all other work, both on and off-site, in offices and elsewhere that is in support of rope access and related activities. 'Other' also includes all hours not accounted for by the above category including rope access trainers, unless actively on rope, and all non-rope access training.

'Training' – Activities undertaken at rope access training facilities and establishments by trainees, including assessment. It excludes all trainers and training staff, whose work hours should be reported under either of the above categories. All other training, induction courses, trial work, specialist courses (e.g. use of breathing apparatus or first aid) are excluded and are reported under 'Other'.

For the purpose of this report, the distinction is made between:

'Accident' – An unintended event when personal harm, injury or fatality occurs at work. This will include sprains, strains, illnesses or ill health issues brought on, or made worse, by work.

'Incident', **'Near Miss'** or **'Dangerous Occurrence'** – Any event or situation where no personal harm or injury occurred but which could have led to injury or fatality. In response to comments received, the terms 'incident' or 'Near Miss' replace 'dangerous occurrence' throughout the report, although the meanings are synonymous. Identification of the grade(s) of personnel involved is not required.

In dealing with accidents, the following terms are used:

'Fatality' – Death within one year as a result of an accident or illness at work, or caused by work.

'Major' Injury – Injuries that meet criteria common to most European agencies and other countries, and as listed in IRATA reporting arrangements. 'Major' injuries would include, but is not limited to, broken major bones, amputations, major dislocations, loss of eyesight and need for resuscitation. There is no associated criterion for 'days off work'.

'Over 7 Day Injury' / Serious – Not a 'Major' injury but an injury requiring more than 7 days away from normal work, irrespective of cause. 'Serious' is synonymous with 'Over 7 Day Injury' and will be used to minimise confusion with the term 'Less than 7 Day Injury'.

'Less than 7 Day Injury' – The criterion for a non-reportable accident is now 'less than 7 days off work' (although this is required to be recorded in the UK by duty- holders). If any injury is incurred, no matter how trivial, the minimum reporting level is 'Less than 7 Day Injury' and, in this report, includes all incidents of ill-health and sprains/strains (see below) unless resulting in an 'Over 7 Day Injury' or 'Serious' injury.

Ill Health – A medical condition that leads to interruption or suspension of work due to a non-injurious cause, e.g. psychological, heat- or cold-stress, taken un-well (headache, stomach upset) or other non-trauma medical conditions brought on, or made worse, by work. These instances can be reported as either 'Over 7 Day'/'Serious', 'Less than 7 Day' injury or, if death occurs within 12 months, a fatality.

Sprains/Strains – Muscular injuries that result in prevention or cessation of work. As above, these instances are reported as an 'Over 7 Day'/'Serious' injury or as a 'Less than 7 Day' injury.

Reportable Accidents – For comparative purposes, this term is the total of all fatalities, 'Major Injuries' and 'Over 7 Day'/'Serious' injuries. Thus, 'Less than 7 Day' injuries and 'Incidents' are excluded when comparisons are made with international statistical data, although Eurostat and BLS data are based on different criteria for time off work.

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