WORK & SAFETY ANALYSIS 2020

irata International
Industrial Rope Access Trade Association

ABSTRACT

The report presents data of employment and incidents submitted by IRATA members over the period January – December 2019. During the period submissions were received from 516 members by Q4, an increase of 73 members operating worldwide. Total employed rose to 19,257, associated work hours increased to 22.6 million hours giving an effective 'full time equivalent' workforce of 11,287. The COVID-19 pandemic did not appear to have had any significant impact on the figures supplied.

There were 246 reported events, of which 173 were 'Near Misses'. Injuries and illnesses accounted for 73, of which only 10 were 'Reportable' to authorities, sadly, including one fatality. The overall 'Reportable' injury rate, based on full time working, was only 5-15% of selected latest internationally available work injury statistics. The single fatality resulted in a five-year fatality rate above 'All Industry' figures but within typical ranges of commensurate industries. Overall, the excellent safety record for the Association was maintained.

The summary and conclusions highlighted specific issues raised within the data supplied, and used to make recommendations to further improve safe working of rope access technicians. The emphasis in recommendations was on hazard identification at work sites and human factors in recruitment, selection and training of rope access workers.

Dr C H Robbins

7 August 2020

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INTRODUCTION

The Industrial Rope Access Trade Association (IRATA) International requires members of the Association to submit annual employment as well as accident or incident data. Data supplied included regional identification but excluded identification of individual members. Calculation of accident rates required details of employment numbers. Gratitude is due to those who assembled and presented data for analysis, both within individual member companies as well as IRATA Head Office. All data supplied, both employment and incident events, was subjected to quality checks prior to analysis.

This report presents summaries of the data provided for the period January - December 2019 by all member companies. It is important to note that the numbers of employees reported relate to member company employees only. Thus, IRATA qualified individuals who were not employees of member companies were not covered by this report.

COVID-19, commencing around January 2020, did not appear to influence the work done or the employment figures for 2019. Q4 figures could be submitted up to April 2020, and might have been affected by the inability to assemble and submit them. This does not appear to have occurred, with the possible exception of SE Asia. Member submissions for this Regional Advisory Committee (RAC) rose then fell slightly in Q4. If this resulted in a small reduction in employment and work hours data for this particular RAC in the last quarter, the impact was minimal.

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.

(See Appendix II for description or explanation of various terms used in this report).

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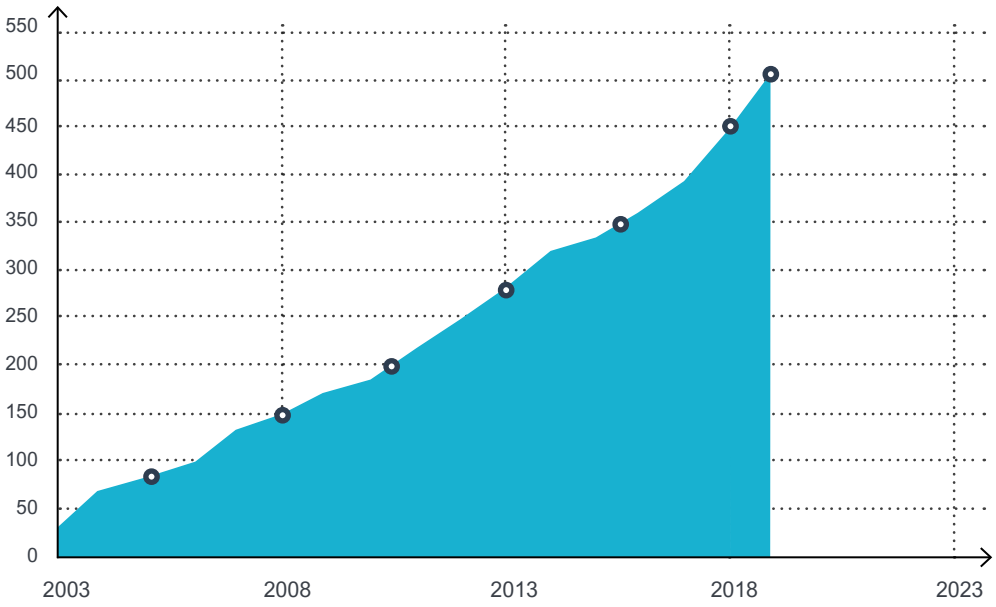
IRATA MEMBERSHIP

Figure 1 shows the continuing increase in membership of the Association accelerating from 443 by Q4 in 2018 to 516, an increase of over 16%.

(Note that the 'membership' referred to in this report is limited to the number of companies submitting data in the last quarter of the year and may not equate to membership figures for the Association).

Figure 1 ¦ IRATA Membership



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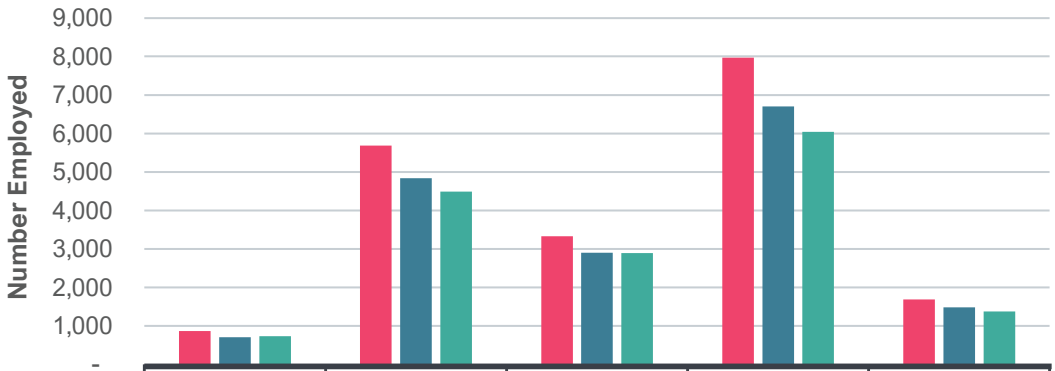
3. EMPLOYMENT STATISTICS

3.1 EMPLOYMENT LEVELS

Employment rose to an average of the quarterly figures for 2019 of 19,527, a rise of over 18% from the previous year, similar to the rise in membership. Distribution of employment between the grades is shown in **Figure 2**.
(Note that the employment figures are taken as the average of the four quarterly figures submitted for the year to smooth out annual variations often encountered, probably due to climatic variations, for the various RAC geographical areas).

Increases in Level 1 and Level 3 numbers may be noted, both approaching a 20% increase over the previous year, with one Level 3 approximately responsible for two Level 1 and Level 2 combined. Although the 'Manager' number increased by only 160, this does represent a nearly 23% increase and reversing the fall in manager numbers of 2017/18.

Figure 2 ¦ Employment by Grade



	Manager	L3	L2	L1	Other
2019	867	5,683	3,324	7,965	1,688
2018	705	4,836	2,904	6,699	1,482
2017	731	4,492	2,893	6,038	1,377

3.2 HOURS WORKED

The total hours worked in 2019 were 22,573,962 or about 22.6 million, including training. This is an increase of 13% over the 20 million hours recorded in 2018, somewhat less than the membership increase of ~ 16% and employment increase of 18%. This will be revealed by a continuing reduction in utilisation. **Figure 3** shows the distribution of worked hours for each grade over the last three years.

It is clear that the increases in work hours ascribed to Level 1, 2 & 3 technicians (19, 16 and 15% respectively) were responsible for the overall increase in work hours from 20 to 22.6 million hours.

Utilisation (hours worked divided by number of employees) for the last four years are given in the table below.

This shows a continuing, albeit small, reduction, remaining well below a maximum utilisation of about 2,000 hours per worker per annum. This possibly reflects technicians, with technical skills, trained to use rope access techniques, as and when required, to supplement their normal working. I.e., another string to their bow, or should that be another rope?

Year	Utilisation (Hours/ Worker per annum)
2016	1,381
2017	1,171
2018	1,201
2019	**1,156**

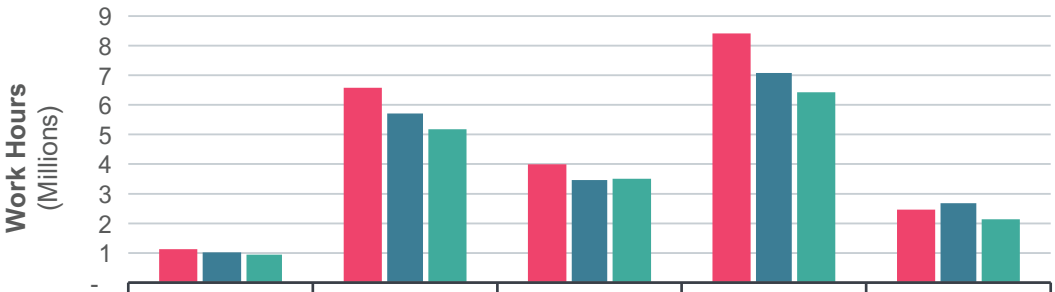
Whilst not of concern, there is a negative consequence of a low utilisation. The 'effective' workforce is greatly reduced, because accident rates relate to 'full-time employees'. Thus, the reported workforce of 19,527 reduces to a full-time workforce of only 22,573,962/2,000 = 11,287 for later comparative purposes. (The 2,000 hours is used internationally as the annual work hours per employee for full-time employment).

Turning now to the location of work hours, the 22.6 million work hours can also be shown distributed between onshore and offshore working and training. Furthermore, work hours can also be split between working on ropes and off ropes. During the early years of the Association, most rope access work of founder members was carried out on North Sea offshore platforms.

Figure 4 shows the distribution of hours between the category locations. Onshore working continued to outstrip offshore working, accounting for ~ 58% (13 million hours) whereas offshore working only accounted for 39% (8.9 million hours). In both cases, work 'On Ropes' slightly exceeded 'Other' working (i.e. 'off rope').

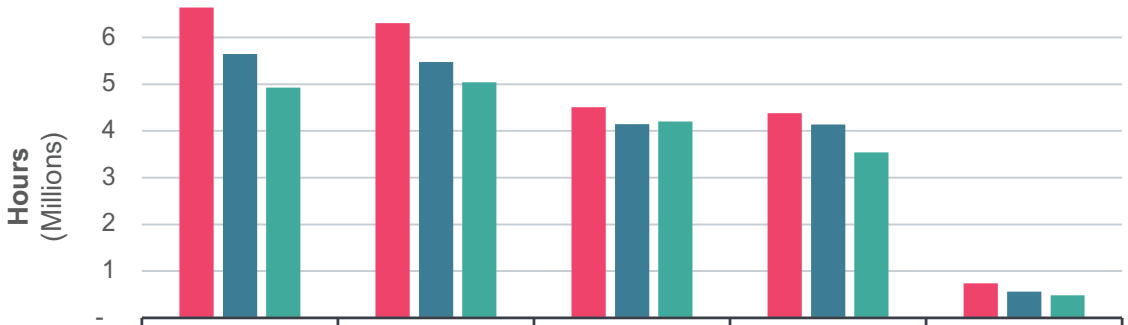
The chart also shows about 3.26% of hours reported as training which will now be examined.

Figure 3 ¦ Distribution of Work Hours by Grade



	Manager	Level 3	Level 2	Level 1	Other
2019	1,123,859	6,582,043	3,997,524	8,409,627	2,460,909
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

Figure 4 ¦ Distribution of Work Hours by Location



	Onshore on ropes	Onshore other	Offshore on ropes	Offshore other	Training
2019	6,641,396	6,310,132	4,510,080	4,376,937	735,416
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 hours should refer only to rope access training, including refresher training and assessments. All other training, including trainer hours should be reported under normal working. The total of hours reported for training was 735,416 or about 3.26% of total reported hours, an increase of over 30% over 2018 and much higher than the 18% increase in employment. As will be seen later, this varied considerably between the RACs.

However, there may be some element of anomalous reporting that is particularly significant in the case of one RAC (see later in the section following). Average training hours per employed was 40. The training data will be examined in more detail later in the following section.

3.4 REGIONAL ADVISORY COMMITTEES (RACs)

In 2012, it was decided that zones or regions around the world would be established, overseen by Regional Advisory Committees (RACs). There are currently 14 RACs:

- 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
- Scandinavia
- South Africa
- South East Asia and Far East
- UK

Table 1 summarises the figures for the individual RACs and contribution to the overall 2019 data, together with membership numbers, employment, work hours and calculated utilisation of employed. The proportion of total work hours for 2019 submitted by each RAC is also given in the last column.

The only RAC not showing an increase in membership was the miscellaneous group, 'Other'. The variation in utilisations between RACs may be noted, from as low as 770 to as high as 1,712 hours per employed. Bearing in mind that 'full employment' would be represented by approximately 2,000 hours per employee, only two RACs approached this figure.

The only possible indication that COVID-19 might have influenced the data was the small reduction in submissions for SE Asia and the Far East from Q3 to Q4 (71 to 68). This was accompanied by slight reductions in employment (2,378 to 2,297) and work hours (555,954 to 523,527) for Q3 and Q4 both relatively minor in terms of overall figures.

The distribution of employment between grades for each RAC is given in **Table 2.**

Table 1 ¦ 2019 RAC Summary

RAC	No. of members (at Q4)	No. employed (average of 4Qs)	No. of work hours	Utilisation (hours per employee)	% of total work hours
Australasia	50 (41)	2,034	2,296,749	1,288	10.2
Benelux	25 (21)	535	425,691	796	1.9
Brazil	27 (25)	628	483,809	770	2.1
D-A-CH	7 (6)	53	65,970	1,244	0.3
Eastern Europe	30 (28)	608	506,810	834	2.3
Mediterranean	23 (17)	254	275,387	1,084	1.2
MECASA	57 (44)	2,685	4,597,818	1,712	20.4
North America	36 (27)	1,905	1,767,668	928	7.8
North Sea Operators	25 (21)	2,128	2,163,532	1,017	9.6
Other	19 (23)	861	1,428,146	1,659	6.3
Scandinavia	13 (12)	268	231,179	862	1.0
South Africa	19 (13)	398	521,847	1,311	2.3
SEA & FE	68* (58)	2,160	1,965,319	910	8.7
United Kingdom	117 (107)	5,010	5,844,037	1,166	25.9
Total or average	**516 (443)**	**19,527**	**22,573,962**	**1,156**	**100.0**

* Fall from 71 in Q3

( ) Figures for 2018

Table 2 ¦ 2019 RAC Distribution of Grades

RAC	Managers	Level 3	Level 2	Level 1	Other	Total
Australasia	87	728	343	815	61	2,034
Benelux	38	173	92	180	52	535
Brazil	30	181	120	248	49	628
D-A-CH	9	19	5	5	15	54
Eastern Europe	45	209	102	214	38	608
Mediterranean	30	64	38	98	24	254
MECASA	113	535	521	1,142	374	2,685
North America	66	432	215	1,052	140	1,905
North Sea Operators	32	663	299	886	248	2,128
Other	27	264	191	252	127	861
Scandinavia	25	106	72	51	14	268
South Africa	31	112	66	120	71	398
SEA & FE	103	673	420	838	126	2,160
United Kingdom	231	1,524	841	2,064	349	5,010
Total	**867**	**5,683**	**3,324**	**7,965**	**1,688**	**19,527**

Individual RACs and members may compare their own figures with the overall averages. Managers were responsible for staff numbers that varied from as low as 8 to as many as 32, averaging at 22 per manager. The only exception was North Sea Operators where a manager was typically responsible for about 66. This is probably explained by noting that most rope access teams working on platforms would be locally managed by platform staff, their own managers remaining ashore.

As expected there was great variation in the proportions of the main working grades, Level 1 to Level 3, between the RACs. The average ratio was approximately one Level 3 to two Level 1 and 2 combined, maintaining previous years ratios. The combined number of qualified Level 1-3 technicians remained at ~87% of total workforce.

Table 3 shows the differences between RACs in terms of the balance between Onshore and Offshore working. Overall, the balance continued to move in favour of an increasing Onshore share of the total work hours reported. But the balance varied between the RACs. Extreme examples were North Sea Operators, Others and Brazil with a high incidence of Offshore working. On the other hand, Onshore working predominated in, for example, Australasia, Benelux, D-A-CH, Mediterranean, MECASA, North America and Scandinavia. Others had a balance between Onshore and Offshore working such as South East Asia & Far East and UK.

A scan of Table 3 also shows significant variation in training figures between RACs. **Table 4** takes the training hours and presents them as a percentage of the overall work hours for each RAC. The previous percentages for 2018 are shown alongside the 2019 figures for comparison. The variations are now clear.

The North Sea Operators low figure of only 0.48% was explained by the 'importing' of previously trained contract personnel. However, the very large spread of training percentage figures, up to as high as 24%, was surprising, with no obvious explanations for the higher figures. A possible explanation was 'faulty' reporting such as inclusion of trainer hours along with trainee hours, contrary to reporting requirements. If this was the case, the consistent trend of 2018 and 2019 figures suggests the problem continued. But, it should be noted, that the training total figure was a result of consistently high individual training figures for many companies over all quarters. This would not support the suggestion of simple 'faulty' reporting.

Nevertheless, even allowing for some degree of reporting excessive hours, the majority of RACs reported training hours roughly within the range 2-4% of all work hours. In effect, this means that every employee would receive an average of between 24 and 48 hours of training and assessment in rope access per annum (based on ~1,200 hours employed per annum) with an average of 40. This level of training reflects the importance members and the Association place on training.

Previous reports have presented more detailed charts and data for each individual RAC. This process was abandoned in 2018 for the sake of report brevity. However, individual RAC reports of details may be prepared on request.

Summary of employment data	
Total number employed	19,527 (average quarterly figure)
Total work hours	22.4 million
Equivalent workforce	~11,300 (based on 2,000hrs per employee)
Total training hours	734,416 (included within total work hours)

Table 3 ¦ 2019 RAC Work Hours by Location

RAC	Onshore on ropes	Onshore other	Offshore on ropes	Offshore other	Training
Australasia	1,238,963	722,631	148,272	146,788	40,095
Benelux	158,780	118,736	106,046	34,329	7,800
Brazil	65,416	65,406	147,667	85,609	119,711
D-A-CH	16,723	43,824	-	-	5,423
Eastern Europe	110,319	209,693	33,770	94,492	58,536
Mediterranean	121,736	109,298	13,706	10,663	19,984
MECASA	1,755,895	1,781,545	375,159	596,649	88,570
North America	817,236	760,563	70,776	40,986	78,107
North Sea Operators	110,199	358,705	485,924	1,198,248	10,456
Other	26,409	203,531	681,571	473,828	42,807
Scandinavia	97,920	59,346	44,696	24,902	4,315
South Africa	32,344	225,420	75,819	175,593	12,671
SEA & FE	402,159	493,750	540,967	434,039	94,404
United Kingdom	1,687,298	1,157,684	1,785,707	1,060,811	152,537
Total	**6,641,396**	**6,310,132**	**4,510,080**	**4,376,937**	**735,416**

Table 4 ¦ 2019 RAC Training Percentage of Work Hours

RAC	Training	Total hours	% Training 2019	% Training 2018
Australasia	40,095	2,296,749	1.74	2.04
Benelux	7,800	425,691	1.83	2.31
Brazil	119,711	483,809	24.8	23.9
D-A-CH	5,423	65,970	8.22	4.1
Eastern Europe	58,536	506,810	11.6	12.5
Mediterranean	19,984	275,387	7.26	12.5
MECASA	88,570	4,597,818	1.93	1.49
North America	78,107	1,767,668	4.42	3.76
North Sea Operators	10,456	2,163,532	0.48	0.46
Other	42,807	1,428,146	3.00	3.87
Scandinavia	4,315	231,179	1.87	1.42
South Africa	12,671	521,847	2.43	3.75
SEA & FE	94,404	1,965,319	4.8	3.69
United Kingdom	152,537	5,844,037	2.61	1.71
Total / Average Percentage	**735,416**	**22,573,961**	**3.26**	**2.81**

Image courtesy of Spider Access © 2020

4. ACCIDENT AND INCIDENT STATISTICS

4.1 INTRODUCTION

(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').

Before addressing the accident and incident data, it should be noted that, unfortunately, only the immediate outcome of accidents and incidents is usually presented. Therefore, the analysis relies on the outcome data, supplied in tabulated summary form. Comparison of causal data against previous data was not always possible because of unexpected changes in reporting format and categorisations of events

4.2 CONSEQUENCES OF ACCIDENTS AND INCIDENTS

A total of **246** acceptable reports were received. Within this total were **73** reports of **actual injuries or illnesses**, 10 of which were reportable and, sadly, including one fatality. The 'Reportable Accidents' are shown in the table alongside those for 2017/8.

Reportable	2019	2018	2017
Fatal	1	0	3
Major	2	1	1
Serious (over 7 days)	7	4	9

The following table below summarises the data for the remaining 236 'Less than 7 Day Injuries' and 'Near Misses' or non injurious incidents:

Not reportable	2019	2018	2017
< 7 day injuries*	63	60	74
Near miss	173	101	86

* Recordable in the UK

Not reportable	2019	2018	2017
< 7 day injuries	2.74	3.00	4.05
Near miss	7.70	5.20	3.86

Events per million work hours

A very positive result was the increase in 'Near Miss' reporting. Although still below that expected for a working population of over 19,000 and associated 22 million work hours, the increase was encouraging. The table does not take account of differences in the annual 'populations', however, the adjacent table takes the number of events and divides them by the working hours recorded for each year. This allows direct comparison with previous years. The improvements, both in a significant reduction of minor injuries and a welcome increase in 'Near Miss' reporting become clear. (Repeating the process for 'reportable' accidents would be unrealistic because of the very small number of accidents).

4.3 LOCATION OF ACCIDENTS AND INCIDENTS

All 'events' reported are tabulated next according to workplace location. Training generally takes place at an onshore location and here accorded a separate 'location' (deducted from onshore locations).

Location	All Reports	All near misses	All injuries*	Injuries per million hours
Onshore	154	121	33	2.55
Offshore	53	24	29	3.15
Training	39	28	11	14.96
Total/Average	246	173	73	3.23

The majority of 'Near Miss' reports originated from onshore members. The smaller proportion of 'Near Miss' reports from offshore possibly reflects commercial concerns as most technicians will be working under local platform management rather than their own management. The relatively high incidence of training related 'Near Misses' was not surprising and some reports appeared within the realm of 'normal student errors'. Some training 'Near Misses' reported wider implications that led to modification or enhancement of training regimes.

Considering actual injury events, including the single fatality (an onshore event), there was little difference between the injuries sustained Onshore or Offshore per million work hours. Training, on the other hand, reported an injury rate five times greater but, as in previous reports, this was not surprising for several reasons.

Location, in terms of the physical workplace ('On Rope', 'Other' and 'Training'), was also defined in the data. The 2019 data is shown alongside similar data for 2016-2018 in the table below: The majority of reports relate to 'On Rope' working, as expected.

	On Rope	Other	Training
2019	152	55	39
2018	111	29	26
2017	104	26	18
2016	61	25	12

(Number of all reports)

However, again, the figures do not take into account the hours 'at risk' or 'exposure'. Dividing each number by the work hours for each location (section 3.2) enables comparisons to be made against previous years, shown in **Figure 5.**

The immediate assumption from the chart is that training increasingly generates more reports, possibly reflecting a recognician of the value of such data by training members. Additionally, training must, by its nature, involve trainees undertaking difficult exercises and relatively complex manoeuvres under close surveillance. Further, the reporting of events may be made with little commercial concern.

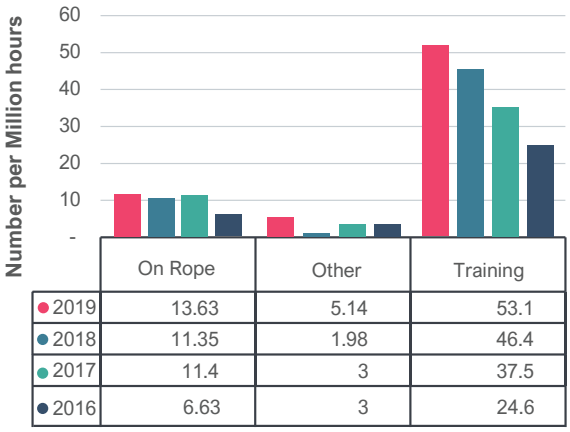
The above implies that training continues to be the most 'risky' work location. Of the 39 events reported during training, 29 were 'Near Misses', 8 were 'Less than 7 Day' injuries, 1 'Over 7 Day' injury and 1 'Major' injury (a broken arm). Distribution of all accidents between the work site location categories are given in the following table.

The significantly higher accident (injury) rate whilst training was approximately five times that of working on site on a 'per hour' basis.

Image courtesy of CAN UK Group © 2020

	Fatal	Major	Over 7 days injury	Less than 7 days injury	Accident Rate per million work hours
On Rope	1	1	2	36	3.50
Other	0	0	4	19	2.15
Training	0	1	1	8	13.42

Figure 5 ¦ Working Location of all Reports



	On Rope	Other	Training
2019	13.63	5.14	53.1
2018	11.35	1.98	46.4
2017	11.4	3	37.5
2016	6.63	3	24.6

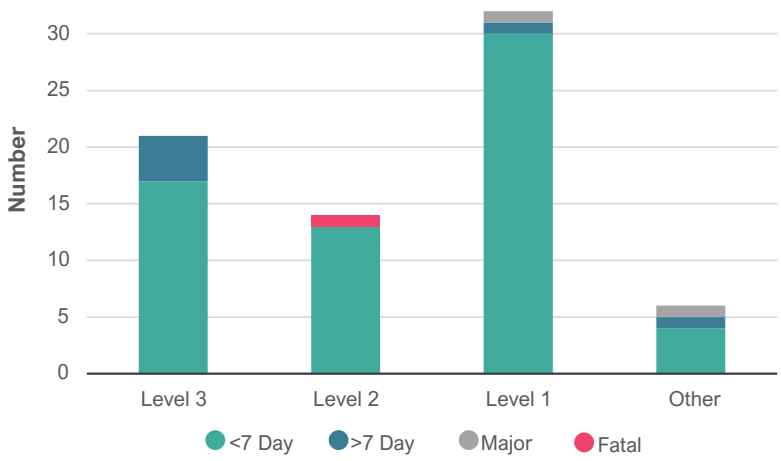
4.4 ACCIDENT EVENTS BY GRADE

The 73 injuries sustained by individuals are shown in **Figure 6** according to grade, including the seriousness of injury and the single sad fatality of the Level 2. Cold numerical assessment of the fatality reflects nothing of the impact on friends and family of the event. Most injuries, irrespective of severity were born by Level 1s.

However, to obtain comparative data, it is again necessary to take into account the 'population' of each grade by dividing by the number employed within each grade. **Figure 7** presents the data per thousand employed within each grade alongside data for 2017 and 2018. When the 'populations' are taken into account, the figures merge, being about 4 injuries per thousand for all grades including 'Other'. It appears that several Level 1 trainees, i.e. not yet qualified and designated 'Other' at the time of their accidents, may explain the relative increase in injury rate for that grade.

(Repeating the process using millions of work hours per grade instead of employed numbers produces a very similar result, with all grades lying in the range 2.8 to 3.7 injuries per million work hours).

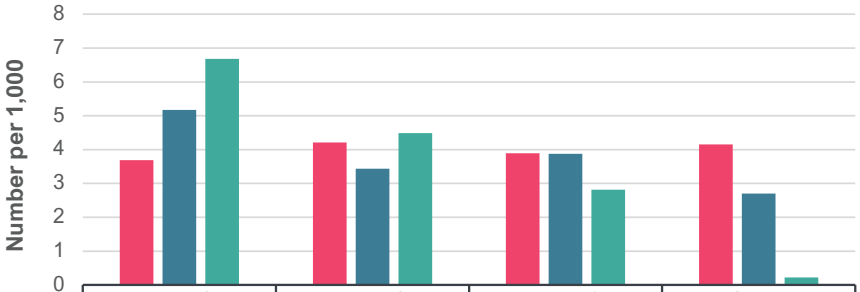
Figure 6 ¦ Injuries by Grade



The chart shows a significant fall in the rate of accidents sustained by Level 3 technicians. However, the injury numbers involved remain statistically small and this is particularly apparent in the significant increase in injury rate to 'Other' grade workers where, in reality, only seven injuries were sustained by ~1,700 workers.

The single 'Fatal' injury was sustained by a Level 2, 'On Rope' and falling to ground unrestrained when selected attachment points failed. One 'Major' accident occurred when a Level 1, technically 'On Rope' but un-roped and no longer wearing harness, fell unrestrained ~5m, sustaining head and leg injuries. Both accidents remained under investigation at time of writing. As noted previously, the second 'Major' injury occurred when a trainee broke an arm.

Figure 7 ¦ Comparative Injuries by Grade



	Level 3	Level 2	Level 1	Other
2019	3.69	4.21	3.89	4.15
2018	5.17	3.44	3.88	2.7
2017	6.68	4.49	2.82	0.22

4.5 BODY PART INJURIES

Figure 8 shows the distribution of reported 'injuries', sustained in 2019, alongside those for the previous two years. Stomach injuries (nil for the previous three years) are re-introduced on the chart because of the five injuries reported in 2019. It should be noted that the chart is of actual numbers of injuries and takes no account of 'populations'. Not shown on the chart is one instance of a cardiac condition and three reports of lung or respiratory problems.

In one of the events, two rope access technicians (of a party of four workers), were caught in a fire/smoke blast due to a plant isolation failure. One of the rope access technicians also sustained burns to an arm in the accident. A second event involved asbestos dust encountered during concrete repair whilst a third event was triggered by H2S alarms affecting three technicians. So, although no actual injury may have been incurred in these cases, the potential threat was identified.

The total number of cases (82) exceeds the reported number of injured persons partly because some were multiple injuries to individuals and partly because no actual personal injury was incurred in some reports.

The significant increase in facial and eye injuries may be noted. Most reports, 18 of 24, involved various debris entering eyes such as paint flakes, rust, dust and corrosive products. The remaining six reports were facial or mouth injuries (lip, lost tooth) caused by various strikes or impacts from tools or fixed objects. Several incidents seemed to involve the failure of eye protection PPE, including during removal of the eye protection itself. Six cases of debris in eyes occurred during painting preparation, bristle blasting or chipping. This is an area of concern and consideration should be given to the use of improved eye protection PPE, particularly for those working where dust and debris is a threat.

Two of the three head injuries were in the fatal and major injury accidents categories. Of the 12 arm injuries, three were strain injuries and a broken arm sustained during training. Three were injuries during 'On Rope' working; the balance of six were caused by various tools and slipping.

Hand/finger injuries (13) continued to fall slightly from the 2018 figure of 15. Three cuts or damage to hands were caused by drills, five from various work materials including an ice block and five from rope access equipment or during rope access training. All but one of the work injuries occurred whilst wearing gloves which

↑18%

INCREASED EMPLOYMENT
(from the previous year)

↑13%

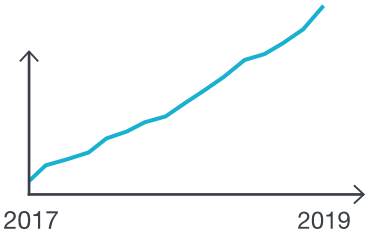
INCREASED WORK HOURS
(since 2018)

↓2.9

LESS LEVEL 3 INJURIES
(per 1,000 technicians since 2017)

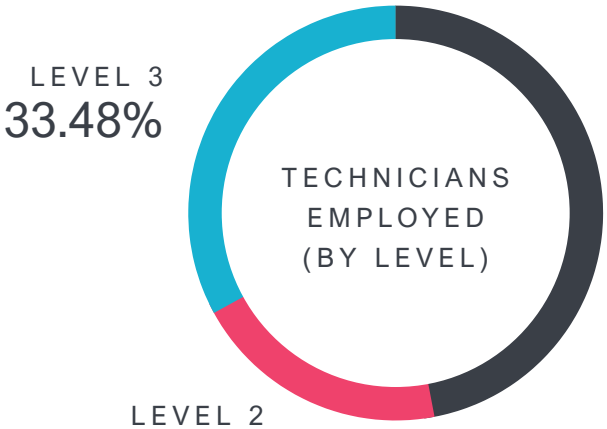
↓225

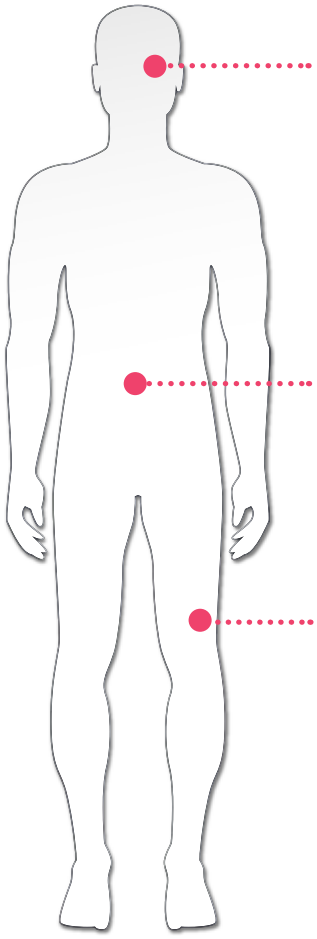
LESS WORK HOUR UTILISATION
(since 2016)



16%

INCREASE IN MEMBERSHIP





24 EYE INJURIES

Several incidents seemed to involve the failure of eye protection PPE, including during removal of the eye protection itself.

5 STOMACH INJURIES

reintroduced due to 2019 injuries; nil for the previous 3 years.

5 LEG INJURIES

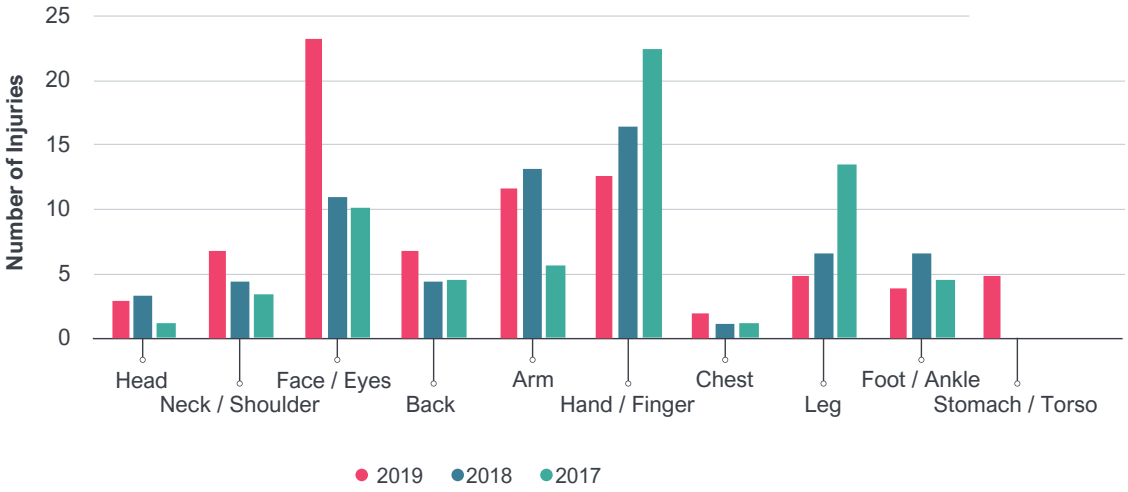
included a burn, a ladder fall onto a shock absorbing lanyard, a cut from wire mesh and a restrained fall.

may have reduced but not eliminated various puncture wounds.

Three of the five stomach or torso injuries were caused by muscle strains or pulled muscles. One case involved harness pressure, alleviated simply by using a suspension seat, and a final 'injury' was caused by caustic soda chemical burn to the posterior. Four of the seven neck/shoulder injuries were due to various strains and muscle injuries from rope access related training and work. One injury was due to falling debris; a further injury was caused by a hot condensate burn. One of the injuries received in the fatal fall was reported to be a neck/shoulder injury.

Two ankle injuries were caused by twisting and a further two slipping on ladders. The five leg injuries included a burn from oxy cutting slag landing on an unprotected leg, a ladder fall onto a shock absorbing lanyard, a cut from wire mesh and a restrained fall when a coping stone was dislodged. A leg injury was another injury in the fatal fall.

Figure 8 ¦ Body Part Injuries



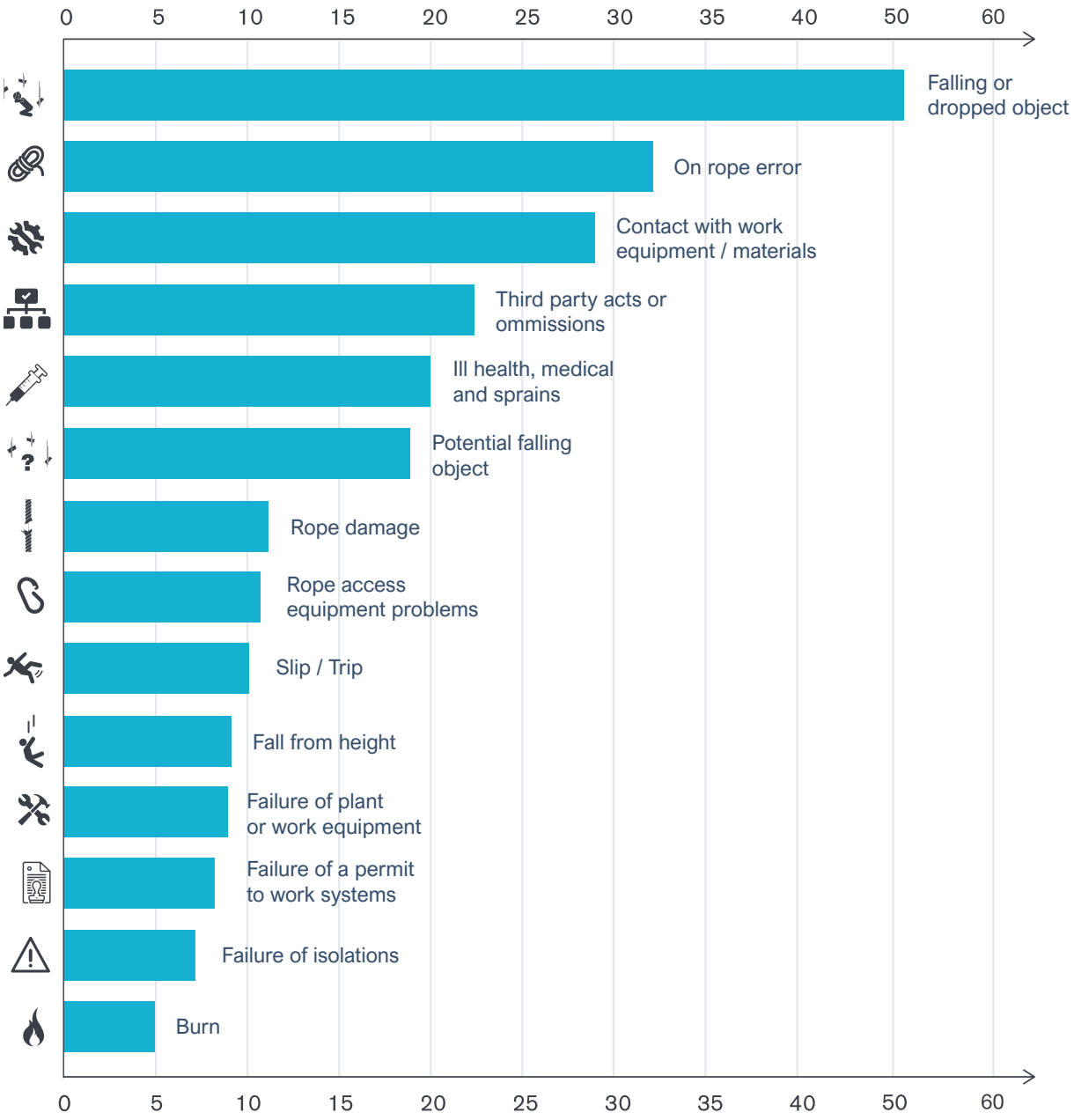
4.6 CAUSES OF ACCIDENTS AND INCIDENTS

Only the category that most closely described the immediate cause of an accident or 'Near Miss' were submitted in reports. It is accepted that this is a weakness of the analysis as data provided frequently did not identify root causes. **Figure 9** presents the data supplied, amended and corrected when necessary to comply with reporting requirements. Unfortunately, comparison with previous data was not always possible because the reporting format for 2019 was changed from that previously used. This was for the purpose of adding more categories of injury.

Omitted from the chart were 'Collapse' with two items, 'Electric shock', 'Explosion' and 'Asphyxia' all with one item, and 'Overturn' with nil.

As in previous years, the most numerous causes in reports was 'Falling objects' (51), 11 of which were rope access items dropped by trainees. The remaining items dropped included all the usual rope access devices as well as batteries (2), phones (2), a meter, helmet, headlamp, tools and metal plates as well as various structural materials. Also falling debris, ice and, in one case, hot condensate caused actual injuries. In addition, and to the great credit of technicians, there were 18 instances of potential threats from falling objects, many items discovered left behind by previous workers (8 reports).

Figure 9 ¦ Identified Cause in Reports



(It is necessary to provide notes on the data supplied (which required significant rectification during checking). 'Manual handling' data was omitted because it clearly caused confusion, frequently being interpreted as 'manual error'. Also omitted was 'Operator error or omission' partly because it was covered in more detail later and partly because it was an integral factor in a large proportion of incidents and accidents anyway. 'Rope access equipment failure' and 'Rope access equipment malfunction' categories have been combined into 'Rope access equipment problems'.

'Rope damage' continued to be identified as a separate category. 'Illness and medical condition' was also combined with 'Sprains'. Two additional categories were created to include 'Rope errors' (errors using rope access) and 'Potential dropped objects' which were identified in several reports. Also added were instances of 'Third party acts or omissions'. Conventionally, falls include slips and trips. A distinction between slips/trips and actual falls were more appropriate in this particular industry, hence, they continued to be separated in the analysis).

Once again, reports of ‘third-parties’ affecting work, were significant with 25 incidents and ‘Near Misses’ recorded. They included a variety of events. ‘Static’ problems included unexpectedly encountering asbestos, cabling, incomplete scaffolding with green tags and loose flange bolts. ‘Dynamic’ problems encountered included crane movements contacting a tension line whilst in use by a technician, an object dropped close to a RAT by another contractor working above and a boat incursion beneath a jetty running over ropes in use by RATs working under a jetty.

Errors and omissions during rope access working included 11 which occurred during training and assessment. The majority of working errors related to rigging and anchoring (one of which led to the fatality) and single point attachments spotted during lead climbing.

Rope damage or severance occurred in 13 reports, an increase over the 8 reports in 2018. In two cases rope had been cut by third-parties. Two sets of ropes were degraded by long term exposure to weather and a third by wind damage. Abrasion and edge cutting was reported in four cases – the edge cutting occurred when rope protection was dislodged when the rope was passing through a narrow gap. There was one instance of a rope burnt through on a hot pipe.

Although seven reports of permit failures led to incident reports, there did appear to be several other reports that indicated some form of communication failures or, for example, work site intrusions by ‘third-party’ workers (which might imply permit failures). Isolation failures (4) may also be considered ‘permit failure’ related. One isolation failure led to workers enveloped by exhaust fumes and smoke. Another involved deluge discharge and a further one involved re-pressurisation of plant caused by a passing (leaking) isolation valve. Multiple workers were struck by a blast when residual hydrocarbon gases (inadequate venting/purging?) in a plant ignited. Two suspended RATs were hit by the smoke and flames, one receiving slight burns to an arm. The plant had not been properly cleared and vented before allowing work to commence.

Of the nine falls, most were short falls, generally restrained but with some slack. One trainee fell ~5m on rope because he maintained a tight grip on his rope slowing descent sufficiently to prevent the ASAP from operating. Finally, he released his grip on the rope as he closely approached the ground. The ASAP was then able to operate bringing him to a halt less than 1m from the ground. One technician disconnected himself from ropes and, un-roped, fell ~ 5 m and suffered multiple serious injuries. The fatality sadly resulted following a ~15m fall when both selected rope anchor points failed.

The two ‘Collapse’ items, omitted from the chart, involved a glass panel breaking during installation and a silo roof giving way under the weight of a RAT. Fortunately, there were no injuries involved in either event.

‘Human Factors’, previously included within ‘Causes’, were expanded into more specific categories, dealt with in section 4.9.

4.7 MANAGEMENT

Thorough investigation of most incidents and accidents, inevitably, would identify some aspect or factor of management or supervision that, in some way, was involved in the event. Such thoroughness may be rarely the case except where the outcome of an event was serious. However, reporters of incidents and accidents are encouraged to attempt to identify failings where appropriate. The results of their submissions are shown summarised in **Figure 10.**

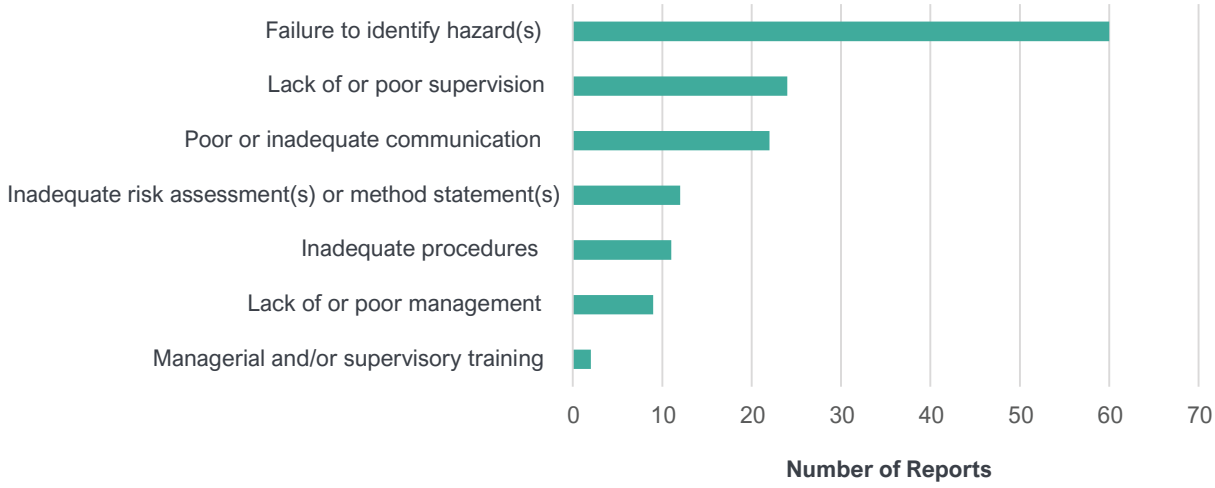
It is important to recognise that many reports may be submitted by managers or supervisors themselves. Thus, there may be some reluctance to recognise management failings that contributed or led to accidents or incidents. Of 246 reports, 131 did not identify any management failure. In many cases this was reasonable. For example, reports of potential falling objects, tripping over obstacles, slipping on ladders, deliberate individual 'failings' and third-party intrusions may be beyond management or supervisor control in the first instance. The single fatality was still under investigation and, understandably, omitted response.

Nevertheless, it was encouraging to find that 115 reported 'Management Failures' with 27 reports identifying more than a single factor. This may be compared to 213 identified 'Human Factors' (section 4.10) in accident and incident reports, probably a reasonable ratio given the nature of the working environment.

By far the most numerous item in reports was failing to identify hazards or potential hazards (60 reports). In some cases, this appeared to have been a shared failing with clients or site controllers. It was expected this would be reflected by a similar failing of risk assessments, method statements or equivalent but only 12 reports identified this as a failing. Immediate supervision of technicians was also identified as an important factor but, surprisingly, this was linked to a need for better or improved training of managers and supervisors in only two reports.

Poor or inadequate communications was reported in 22 cases, mainly with client/site controllers or third parties. By inspection, seven reports involved communication problems within teams and three with their own management (stores/logistics support). Only nine reports specifically identified 'lack of or poor management'. In four cases, failings concerned ensuring safe work conditions or safety measures (e.g. increasing sea swell or attachment points). The remainder appeared to be concerns with Third Party site management failings and not within the immediate scope of RAT team management.

Figure 10 ¦ Management Failure



4.8 WORKING ENVIRONMENT

Working environment problems were identified in 62 reports though some had more than a single factor. **Figure 11** shows the distribution of the various conditions. Marginally highest were problems with gaining access to or egress from the work site. This included the fatality. 'Poor housekeeping' was exemplified by several reports of loose items left in elevated positions, top of ladders, vessels and on pipework, for example. Also dust and debris were encountered on surfaces and caused eye problems in two cases. Poor work site barricading by a 'third-party' and a fox trapped in a designated smoking area were also included in 'poor housekeeping'.

Adverse weather or ambient conditions were reported to be a problem in 11 cases, two of which were due to ice accumulations at or near work sites presenting potential 'falling objects'. Wind caused three problems with ropes displaced or tangled, one on a wind turbine blade. Wind was also responsible for dislodging welding protection gear, resulting in a leg burn from hot slag. If deterioration of weather conditions were added, this would have become a more significant category.

Surprisingly, of 10 'lack of room' reports, only one cited 'confined space' working inside structures. Most were concerned with conjested pipework, cabling and vessels intruding into work space. Trapping or hindrance of ropes and interference with rope protection measures were real problems as were the presence of hot pipes and vessels, one of which melted a rope.

'Disturbance' came in the form of a technician pulled by his rope towards an unprotected edge during rigging, unexpected movement of wire mesh being handled (resulting in injury) and a site alarm not heard because of excessive local noise at a work site. It is surprising that deluge release, unexpected exhaust release and 'a blast' releasing smoke and flame impacting two technicians were not included in 'disturbance'.

'Lack of maintenance' covered miscellaneous items such as a walkway 'step', frayed lanyard on a tool, lifting bag stitching failure allowing a dropped object and loose coping stone. Only one item referred to rope access equipment although there were other reports elsewhere of sub standard rope access gear.

Figure 11 ¦ Work Environment

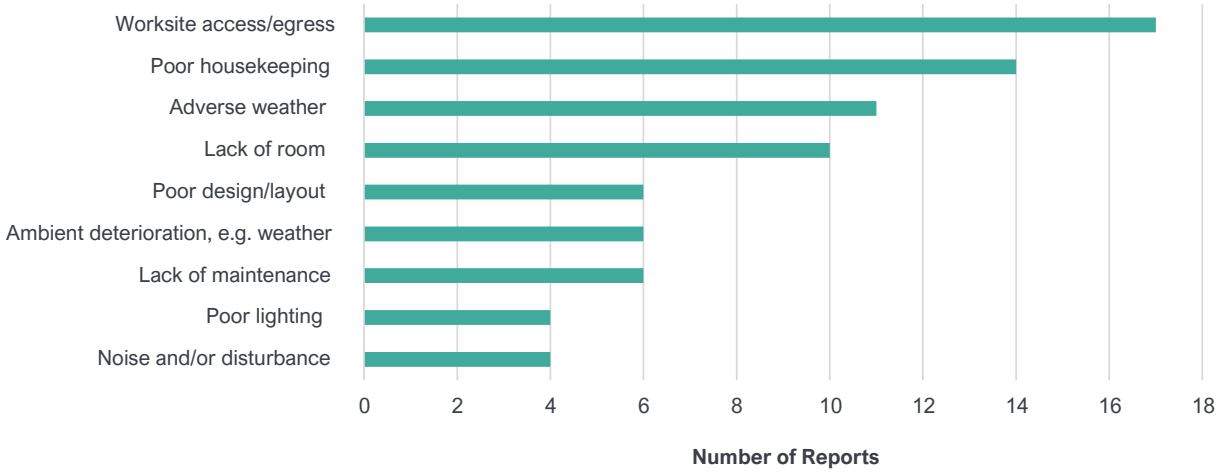
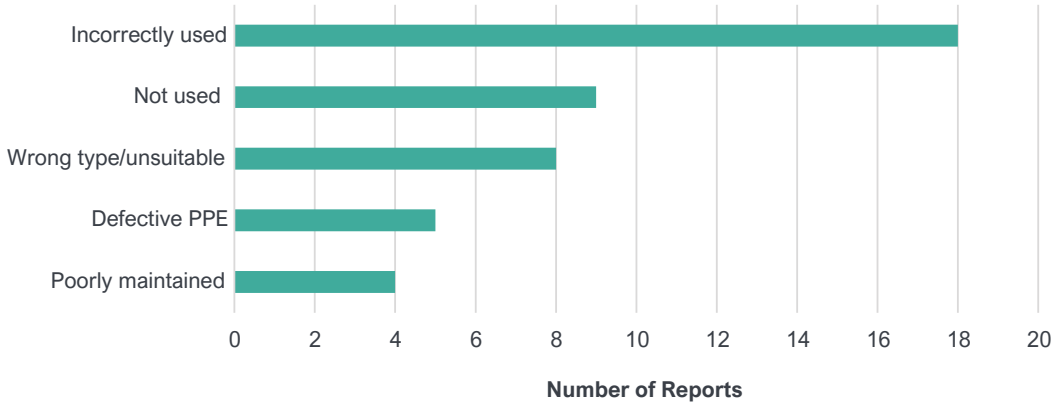


Figure 12 ¦ PPE Problems



4.9 PPE PROBLEMS

The 45 reports of problems with PPE are shown summarised in **Figure 12**. For the purpose of this report, it was accepted that all rope access equipment, including ropes, may be considered PPE if identified in reports. Reports related to work tools were eliminated.

The category with the highest number of reports was 'Incorrectly used'. This included helmets (chin straps not fastened, accidentally set alite by hot slag when set aside), harnesses not fitted correctly or attachments unsuitable, goggles and respirator not fitted properly and several descent or protective fall devices not fitted correctly (or claimed defective but later found fully operational). There were also four reports of rope related 'errors' such as single point attachment or disconnection and rigging problems. (The single fatality was excluded).

'Not used' items', including recognition of retrospective need for PPE following incidents, totalled nine. Filter dusk masks should have been worn when working in the vicinity of potential diesel exhaust gases. Work seat should have been used to elleviate harness discomfort during extended suspension working. Two items included failure to use rope protection by disconnecting from ropes, one leading to a serious fall and major injuries. Miscellaneous items included not wearing a life jacket when working within splash zone, not wearing gloves during drilling operations and not using appropriate ear protection. In two cases, rope edge protection was not fitted although in one case it was more strictly the adequacy of the protection that was at fault.

The eight 'Wrong type or unsuitable' items included five instances where eye protection was inadequate, particularly when working in high dust/debris situations such as bristle blasting, pressure washing and chipping. Doubling up on rope protection measures, there was a case reported where edge protection was considered inadequate, also reported as 'Not used' above. There was also one report of incorrect links fitted to fall arrest equipment.

Only five reports of defective PPE were recorded, four of which were rope access devices (rope rescue pulley, two IDs and a Maillon). Although one rope cut was reported under 'PPE' it was previously noted that there were 13 instances of rope damage/severance overall.

Lack of or 'Poor maintenance' was reported for only four items – swage corrosion on a sling (hidden by opaque shrink fitting), stitching deterioration on a lifting bag, pin wear on an ID and rope protector failing to remain in place during lateral movement. The last item may be more correctly attributed to mis-use or 'unsuitable'?

Given 11 million work hours on rope, nearly 17,000 qualified technicians and ~0.7 million hours training, the number of PPE problems reported seems very low. The stringent selection, inspection and testing regimes applied to rope access equipment does not seem to be applied to other PPE items such as eye protection particularly in highly vulnerable applications such as painting, bristle blasting, pressure washing or chipping.

4.10 HUMAN FACTORS

Before examining the data it is important to recognise limitations of this analysis. Although immediate causes may be presented in summary reports supplied, the true underlying cause(s) may be omitted for various reasons, effectively stopping at the first 'why'. For example, 'Undue haste' may, in fact, have an underlying cause of excessive supervisor pressure or 'Instruction misunderstood' might be due to poor or ineffective instruction or communication difficulties. There may be the temptation to 'blame' the individual rather than identify a management weakness particularly if reports were submitted by 'management'.

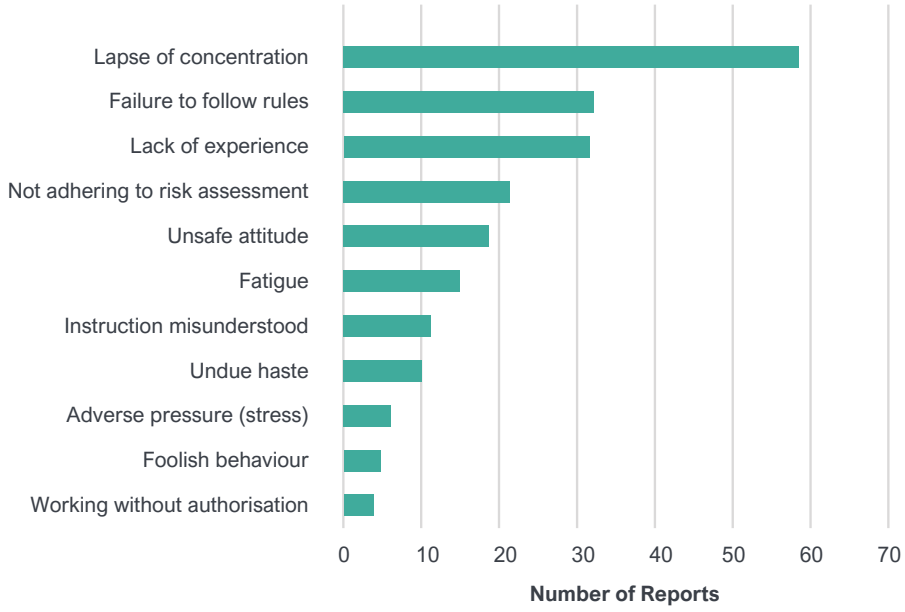
Of the total 246 reported events, 137 identified 213 'Human factors' that were involved. More than one factor was recorded in 50 events, some with as many as three. These figures may be compared to the 115 'Management' items (section 4.7). **Figure 13** presents the distribution of responses within the identified categories.

The most common factor identified was 'Lapse of concentration' with 58 cases. This represented nearly a quarter of all accident and incident reports and double the next factors of 'Failure to follow rules' (33) and 'Lack of experience' (32). Lack of concentration may itself be a result of other factors such as fatigue or external distractions. Similarly, 'Not adhering to risk assessment' and 'Instruction misunderstood' may relate to communication problems, written or oral. 'Lack of experience' could, in turn, be a reflection of poor recruitment, team member selection, supervision or instruction.

Taken together, 'Unsafe attitude' (18), 'Foolish behaviour' (5) and 'Working without authorisation' (4) were of particular concern; not only would the individuals be at serious risk, as in one case of 'Major' injuries, but other team members may also have been put in jeopardy. Again, the question of care in recruitment and selection of staff arose in such cases. Collectively, 'Fatigue', 'Undue haste' and 'Adverse pressure' may have related to supervisory factors as well as individual performance concerns.

Image courtesy of Asaken © 2020

Figure 13 ¦ Human Factors



The categories, as presented, were limited to identification of failings of individuals at the centre of events. This excluded wider issues that may have been present such as negative human relationships within teams or, particularly for trainees, fear of failure and need to impress.

A lesson for management from the data was to take care in recruitment and selection of staff, particularly noting that about 13% attributed 'Lack of experience' of individuals as a contributory cause in reported accidents and incidents. Added to this were the number of other negative traits reported that also raised concerns about the quality of recruitment and selection.

4.11 OTHER FACTORS

4.11.1 RESCUE

Rescue was reported in 12 cases, five occurring to trainees on rope. Two RATs were rescued following exposure to a blast and smoke, a Level 1 was extracted from a vertical descent; following entrapment between ropes during blade inspection, a RAT was lowered to the ground; and during tank washing a RAT was winched to safety when an alarm sounded. Two further rescues occurred when a BA set temporarily failed necessitating evacuation using a 'releasable system' and the second where RATs rescued multiple workers from a stuck man riding basket.

The technician who sustained multiple serious injuries after an unrestrained 5m fall was 'rescued' by being carried, despite injuries, to a nearby lift in the building.

4.11.2 TIME LOST

Only 16 cases reported time off work, excluding the fatality. Reported days off work for all injured persons was 185 days with a further 71.5 days lost by others, giving a total of 256.5 days lost. With an equivalent full time workforce of about 11,300 (see section 3.4), this worked out to time lost of less than 0.02 days per employee, marginally increased by adding time lost by others. The equivalent rate for, say, UK Health and Safety Executive (HSE) would be ~1 day per employee, some 50 times greater for injuries alone. Similar figures would be found elsewhere. The difference extends much further if illnesses were also taken into account in other agency figures. Thus, time lost due to accidents was well below other reported figures.

The continuing low figure of time lost may be partly explained by under reporting and a low injury rate It may also reflect the age range, general fitness and inherent resilience of workers involved in rope access. [http://www.hse.gov.uk/statistics/lfs/index.htm - see tables LFSWDL & LFSINJSUM]

(Lost time is sometimes calculated on a per million hours basis, termed Lost Time Injury Frequency Rate or LTIFR. This would give 185/22.6 or about 9 days per million work hours).

4.12 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.

Summary of accident / incident data	
Total reports	246
Fatalities	1
Major injuries	2
Serious (> 7 day) injuries	7
Minor (< 7 day) injuries	63
Near misses	173

5. COMPARISON OF ACCIDENT DATA

5.1 BASIS FOR COMPARISON

Statistics for reportable accidents generally are based on accidents per 100,000 workers. To convert the accident data, and maintain a pessimistic analysis, a workforce corresponding to the hours worked was used. For 2019, this was 22.6 million hours / 2,000 hrs per person per annum = **11,287 workers.** The 'multiplication factor' per accident becomes 100,000 / number of full-time workers = 100,000 / 11,287 = **8.86 per accident**. The accident rates in 2019 then become:

Fatality	1 x 8.86 = ~9 per 100,000
Major injuries	2 x 8.86 = ~18 per 100,000
Over 7 Day Injuries (Serious)	7 x 8.86 = 62 per 100,000

The total for combined **reportable injuries** was **80 injuries per 100,000 workers** (50 in 2018). A five-year time period was used to assess the low frequency event of fatalities. The legacy of the three fatalities in 2017 continued to haunt and has to be taken into account alongside fatalities in 2015, 2016 and 2019. Over the five-year period, 2015-2019, the five fatalities in a 'working' population of about 50,000 full time equivalent workers (about 100 million accumulated hours), gave a continuing fatality rate of **10 fatalities per 100,000 workers**, slightly higher than the annual figure of 9.

5.2 COMPARISON AGAINST UK, EU AND USA DATA

Differences in data collection between the various agencies require that each must be considered separately, adjusting IRATA data accordingly. The UK Health and Safety Executive (HSE) website key figures for 2019 provisional data in selected industries are tabulated (**Table 5)** together with equivalent IRATA figures. HSE accepts that its figures for injuries may be approximately 50% under-reported.

Table 5 ¦ Accident Rates v UK HSE 2018/19 Data

Industry	Fatalities	Major Injury	Over 7 days injuries	Total (excludes fatalities)
Agriculture, forestry, fisheries	9.2	205	302	507
Manufacturing	0.92	106	362	468
Construction	1.3	128	239	366
All industries	0.45	65	189	254
IRATA	**10***	**18**	**62**	**80**

(All figures, except fatalities, in rounded numbers of injuries per 100,000 employees) *5-year average

http://www.hse.gov.uk/statistics/tbles/index.htm (e.g. See RIDHIST and RIDIND - 2018/19p – p is provisional)

The IRATA injury rate was ~ 30% of the UK 'All Industry' rate. If the HSE under-reporting was taken into account, it fell to ~15% of the HSE UK injury rate and 7-10% of other related industries. However, the historical 5 year fatality rate remained higher than HSE annual rates except for that of Agriculture, Forestry and Fisheries.

EUROSTAT figures for 2017 (latest fully available) were based on 'Over 4 Day' injuries in **Table 6**. To compare data, it was necessary to extract accidents that approached the same '4 days off work' criterion used. There were no additional injuries beyond the 'Major' and 'Over 7 Day' injuries leaving the rate at 80 injuries per 100,000 in the table. This figure may now be compared to EU 28 2017 figures. The large range of figures supplied by individual member states may be noted.

Table 6 ¦ Accident Rates v Eurostat 2017 Data

Industry	Fatal	Range of fatal injuries	Over 4 days injuries	Range of injuries by country
Agriculture, forestry, fisheries	6.12	0 – 34.2	2,097	68 – 5,325
Manufacturing	1.46	0 – 3.73	1,836	94 – 4,422
Construction	5.6	0 – 17.44	2,873	121 – 6,580
All EU industry	1.65	0.45 – 4.49	1,557	82 – 3,396
IRATA	**10***		**80**	

(All figures per 100,000 workers) *5-year average ** 2018 data only available for some countries

https://ec.europa.eu/eurostat/web/health/data/database
(Folder Health and Safety at Work (hsw), sub folder Accidents at Work (ESAW 2008 onwards) (hsw_acc_work), sub folder Details by NACE Rev 2 activity (hsw_n2)

The IRATA injury rate was less than 5% of the average 'All EU-28' figure for 2017. However, the five-year fatality rate remained above the EU 'All Industry' rate, but well inside the wide range for individual countries. The injury rate (80 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.

USA Bureau of Labor (BLS) data, also based on full-time workers working 2,000 hours per annum, includes all accidents and illnesses requiring any days off work. Thus, it was necessary to include all 13 accidents or illnesses that required any time off work. This gave a rate of 13 x 9 = 117 injuries/ illnesses per 100,000. This figure is included in **Table 9**.

Table 7 ¦ Accident Rates v USA BLS 2018 Data

US private industry sector	Fatalities	Non fatal injuries and illnesses with days away from work (private industry)
Agriculture, forestry, fisheries	23.4	1,701
Manufacturing	2.2	939
Construction	9.5	1,,154
All private industry	3.7	897
IRATA	**10***	**117**

*5-year average
https://www.bls.gov/news.release/pdf/cfoi.pdf
https://www.bls.gov/iif/oshwc/osh/case/cd_r75_2018.htm (e.g. Injuries/illness Table R5)

The IRATA figure for all injuries and illnesses requiring any time off work remained well below all US BLS figures, approximately **13%** of the 'All private industry' rate. The IRATA five-year average fatality rate was about three times the BLS 'All industry' rate but was within the range for related industrial sectors, i.e. construction and agriculture.

Summary of comparable accident data
Reportable fatality rate 10 per 100,000 workers (five-year average)
Reportable accident rate 80 per 100,000 workers
Fatality rate significantly higher than 'All industry' rates but within the range of related industries.
Accident rates a small fraction (5-15%) of 'All Industry' rates and considerably less than related industrial sectors in international statistics examined.

5.3 WORKING 'ON ROPE'

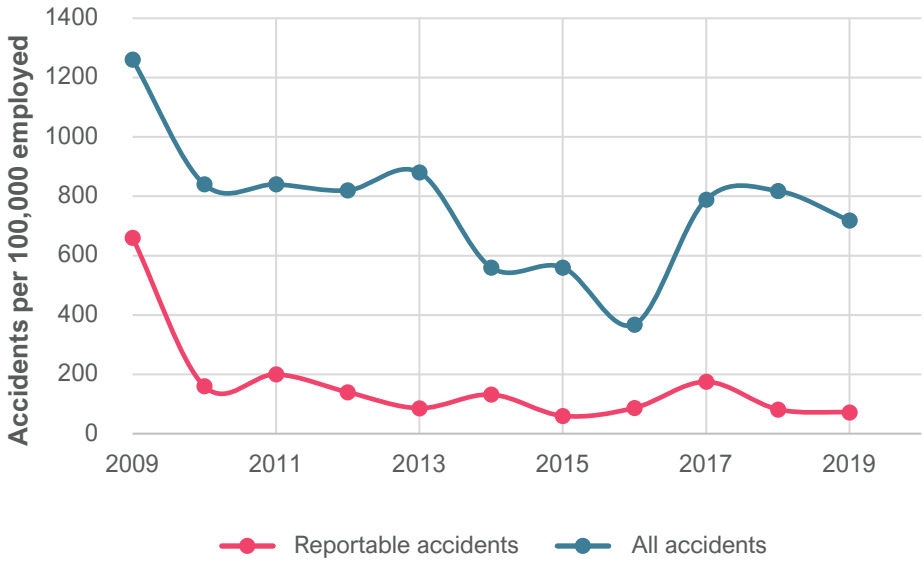
The Association has understandable interest in 'On Rope' working taken in isolation. The number of accidents for 'On Rope' working is summarised in section 4.3 as follows:

Fatality	1
Major	1
'Over 7 Day Injury'	2
'Less than 7 Day Injury'	36
Total	40

The total hours worked 'On Rope' was 11.15 million hours, ignoring training hours. Thus, the accident rate was calculated by total injuries x 100,000 / total work hours 'On Rope' = 40 x 105 / 11.15 x 106 = 0.359 all injuries per 100,000 hours. Converting to 100,000 full- time equivalent workers (at 2,000 hours per worker per annum) gives 718 per 100,000 workers. A similar calculation for the 4 reportable accidents alone gives a rate of 72 per 100,000 workers. A graphical presentation of the accident rate per year over the previous 10 years is shown in **Figure 14**. The Table in Appendix I was extended to include the figures for 2019.

The milestone of over 100,000 million hours, accomplished ‘On Rope’ since the formation of the Association in 1989,, may be noted. It is emphasised that the graph in Fig 14 is based solely on accidents that occurred whilst ‘On Ropes’. Comparison with other sources of ‘Reportable’ data can only be made based on the red line in Figure 14 and data that includes fatalities.The graph shows little change in ‘On Rope’ accidents over the previous year.

Figure 14 ¦ On Rope Accident Rate 2009 - 2019



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, hence, comparisons may be inappropriate.
- Ranking could result in a temptation to withhold data on incidents/accidents.
- The low numbers of accidents and incidents, distributed between 14 RACs, would give virtually meaningless statistics.

6. SUMMARY

Membership and Employment

- Membership of the association continued to rise, reaching 516 members by Q4 December 2019, with an associated workforce of over 19,500 and 22.6 million work hours, increases of 16%, 18% and 13% respectively.
- Training accounted for 0.75 million hours, an average of ~40 hours per employed in the year.
- Work hours spent ‘Onshore’ was 13 million versus 9 million ‘Offshore’.
- Half of all work hours (11 million) were spent ‘On Rope’.

It is concluded that:
The increases reflected a continuing healthy growth of the Association.

Accident and Incident Reports

- Accident submissions totalled 73, distributed as follows:

Fatalities	1
Major Injury	2
Serious injuries (Over 7 Day Injuries)	7
Minor injuries (Less than 7 Day Injuries)	63

- Accident rate for all injuries remained low at 80 per 100,000 employed.
- Reportable Injury rates were only a small fraction of UK HSE, Eurostat 28 and US BLS figures (5-14%).
- The five-year fatality rate of 10 per 100,000, although in excess of 'All Industry' rates, was within typical ranges for commensurate industries.
- 'On Rope' working accounted for 40 of the 73 injuries but only four of the ten Reportable events but, sadly, included the single fatality.
- The highest 'accident' rate, on a 'time at risk' basis, was Training, approximately five times greater than that for 'On Rope' working.
- Injury to Level 1-3 technicians remained at about 4 per thousand for all injuries.
- Injuries to face and eyes raised concerns over the adequacy of PPE for eye protection.

It is concluded that:
Accident data confirmed that an excellent safety record was maintained, with reportable injuries well below selected international figures. The single fatality, when included in the five-year span, gave a rate comparable to similar industries but remained well above that for 'All Industries'.

Data from Accident and Incident Reports

Adding the 73 injuries to the 173 'Near Misses' gave 246 reports containing data on many aspects of working problems and difficulties. The substantial increase in 'Near Miss' reports was most welcome. The summarising that follows was based on an 'irrespective of outcome' basis of all submitted data. An apparently trivial error would be given the same 'weighting' as a serious mistake that led to major injury.

Immediate Causes

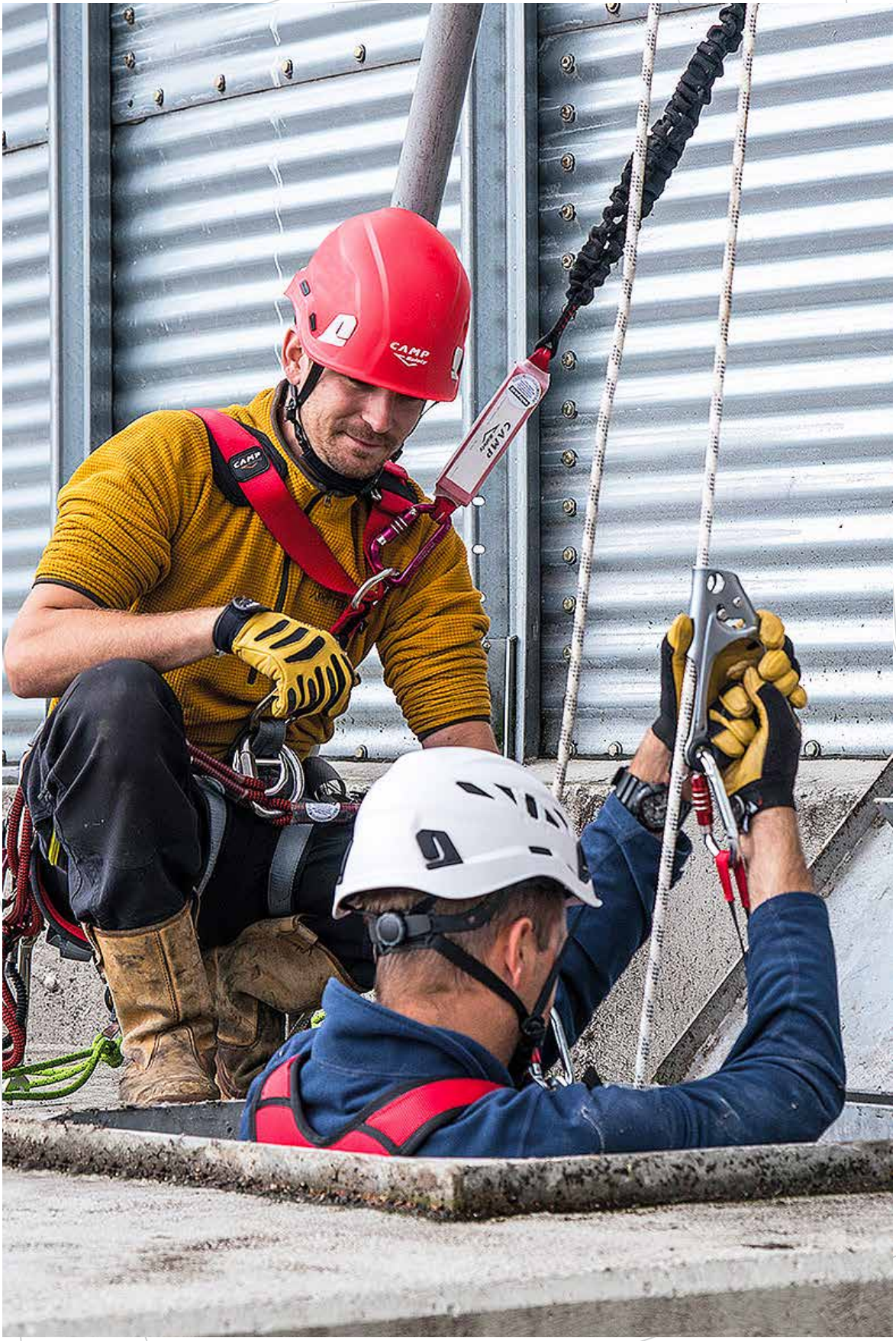
- Falling or dropped objects was the greatest single cause of reported incidents by a significant margin, most attributed to rope access technicians and trainees themselves.
- Technicians should be congratulated for identifying additional numerous instances of potential dropped objects discovered during work.
- 'On Rope' errors, injuries caused by contact with tools and materials and 'Third-Party acts and omissions' were also significant causes of reported incidents, the latter enhanced by permit to work and plant isolation failures.
- Rope damage or severance reports (13) included instances of ineffective rope protection.
- Most falls were rope restrained but two were not, leading to fatality in one case and major injury in the other.

It was concluded that hazard identification, before commencement of work at height, should specifically address:

* potential for falling or dropped objects
* adequacy of rope protection measures
* adequacy of site communications and 'third-party' arrangements.
* site preparations including isolations

Management Factors

Following on from the previous summary, failure to identify hazards was the single most frequently identified management failure, some three times more frequent than deficiencies in supervision or weaknesses in communications. The latter referred primarily to site control and 'third-parties'. This reinforced the previous conclusion, effectively placing responsibility on managers and supervisors.



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Work Environment

Primary concerns involved access/egress problems, housekeeping, adverse weather and lack of room at work sites. In the majority of cases, failure to identify potential or real hazards appeared at the root of many problems encountered.

It is concluded that:
Hazard identification should include site inspection prior to the start of work with emphasis on potential access/egress problems, falling objects, congestion/space limitations and weather conditions/forecasts.
(This supplements the previously identified conclusion related to hazard identification).

PPE (including rope access equipment)

'Incorrect use' of PPE was the dominating factor, many attributed to rope devices. 'Failure to use', in some cases, was 'after the event' considerations as with unsuitability of some PPE supplied and used.

It is concluded that:
Planning, site inspection and pre-work start should ensure supply of suitable and adequate PPE that takes into account work threats including, for example, extended suspension working, high 'eye threat' environments and, particularly, rope protection measures.

Human Factors

- 'Lapse in concentration', the highest proportion of reports, accounted for various diverse situations – training, rope errors, dropped objects and other personal errors.
- Collectively, some factors ('Unsafe attitude', 'Foolish behaviour' and 'Working without authorisation') may reflect on recruitment, whereas others ('Fatigue', 'Undue haste' and 'Adverse pressure') may relate to supervisory factors.
- Team selection may explain others factors ('Failure to follow rules', 'Lack of experience').
- Communication difficulties may have contributed to others ('Instruction misunderstood' and 'Not adhering to risk assessment').

Collectively and based on the above:
It is concluded that:

* In the recruitment of rope access workers, managers, supervisors and trainers should consider not only the technical skills of candidates but also take into account human characteristics pertinent to the working environment.
* In selection of rope access technicians for team working, managers and supervisors should include suitability of individuals in terms of experience required for the work in hand, amongst other factors.
* At the work site and in training venues, supervisors and trainers should ensure all team members and trainees fully understand written and oral instructions and be aware of any factors that may contribute to a lack of concentration including fatigue, excessive stress and other issues.

7. RECOMMENDATIONS

Specific recommendations made in 2018 would largely apply in 2019. Although repetition would not dilute their continuing relevance, the emphasis will now be on responsibilities arising from data supplied in 2019. The recommendations to be made were directly derived from the accident and incident data. In most cases, they should be viewed only as a supplementary 'check list', reinforcing existing company procedures.

1. Managers and supervisors, with responsibility for r**ecruitment and selection** of rope access technicians, should ensure adequate assessment of appropriate human characteristics has been included alongside technical skills, experience and other assessment factors for rope access working.

2. Trainers, when considering overall assessment of trainees, should ensure human characteristics, that may be revealed during training, which are pertinent to the rope working environment, are taken into account.

3. At the work site and in training venues, **supervisors and trainers** should ensure all team members and trainees **fully understand written and oral instructions** and be aware of any **factors that may contribute to a lack of concentration** during 'On Rope' working particularly, including excessive stress, fatigue, and other related issues and distractions.

4. At the heart of improvements of safety measures in the data supplied was **hazard identification**. Therefore, during planning and preparation stages for work, **managers and supervisors** should ensure thorough **hazard identification and assessment of work sites** are carried out, including potential access/egress problems, falling objects and site 'housekeeping', congestion/space limitations, rope protection requirements and weather conditions/forecasts relevant to work sites.

5. In addition, hazard identification should include consideration of any **additional or improved PPE requirements** needed to meet particular site working conditions and threats to personnel. (This is particularly the case for eye protection measures in high dust/debris conditions)

6. Prior to the start of work at the worksite, supervisors should ensure, amongst other items:

a. **Good communications** have been established between all parties
b. All PTW or related conditions have been met, particularly with respect to site preparations when required, all necessary isolations have been applied and proven and other necessary arrangements were in place (e.g. escape and rescue).
c. All team members had been **fully briefed** and all instructions understood.
d. Appropriate and **necessary PPE** issued together with any specific instructions on use.

7. Briefing of individual technicians should include reminders of their duties including:

a. **Behaving responsibly** at all times on site and during training/assessment so as not to endanger themselves and others.
b. **Using PPE** appropriately when supplied.
c. **Raising personal concerns** such as fatigue, medical conditions and any other issues that may impact on rope access performance in a timely manner.
d. **Following all written and oral instructions**, seeking clarification if in any doubt about instructions received.

8. The IRATA Executive should congratulate Members on the excellent accident statistics for 2019 and continue to encourage the membership to report, not only injuries, but all 'Near Miss' incidents that could have led to injury or fatality. The substantial increase in reporting in 2019 by members should be acknowledged.

COVID-19

Whilst the 2019 data was essentially free of influence from the COVID-19 pandemic, the same will not be the case for 2020. An accurate assessment of the impact that the pandemic may have on members of the Association during 2020, and a test of resilience will become apparent in the employment and hours worked data submitted.

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 - 2019

Year	No. of Members	Work hours on ropes	No. 'not reportable (less than 7 days injuries)	Reportable all accidents (fatal, major, over 7 days inuries)	Reportable all accident rate (per 100,000 FTE)***	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
2019	516	11,151,476	36	4	72	718
TOTAL		**107,781,083**	**556**	**101**		

Based on 2,000 hours per person per annum

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

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

*** Col 4 + 5 divided by col 3 then x 2000 x 100,000

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, 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 or is caused at work. This will include sprains, strains, illnesses or ill health issues brought on by or made worse by work, and

'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 are synonymous. Identification of the grade(s) of personnel involved is not required for 'Near Miss' events.

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, for example, 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' or **Serious Injury** – Not a 'Major' injury but an injury requiring more than seven days away from normal work irrespective of cause. 'Serious' is synonymous with 'Over 7 Day Injury' and may be used to minimise confusion with:

'Less than 7 Day Injury' – The criterion for a non-reportable accident is now 'less than 7 days off work' (although 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 'Over 7 Day Injury' or 'Serious'. 'Less than 7 Day Injury' is synonymous with 'Minor Injury'.

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

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

Reportable Accidents – For comparative purposes, this term is the total of all fatalities, 'Major Injuries' and 'Over 7 Day'' or 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 of time off work.

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