



Work and Safety Analysis 2007

**Report by
Dr C H Robbins**

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Tournai Hall | Evelyn Woods Road | Aldershot | Hampshire | GU11 2LL
t: +44 (0) 1252 357839 | f: +44 (0) 1252 357831 | info@irata.org | www.irata.org
Chief Executive Officer: Roderick Dymott | Secretary: John G Fairley FSAE
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A Report on the

**ANALYSIS OF IRATA EMPLOYMENT AND ACCIDENT
STATISTICS FOR 2007**

Dr C H Robbins

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1. INTRODUCTION

This report summarises an analysis of employment and accident/incident reports submitted by member companies to the Industrial Rope Access Trade Association (IRATA) during the period Jan-Dec 2007. Reports were submitted quarterly and covered number and grades of employed with estimates of working hours for various work situations (Form 020R). In addition, details of specific incidents or accidents were supplied separately (Form 021R) for each event or person injured.

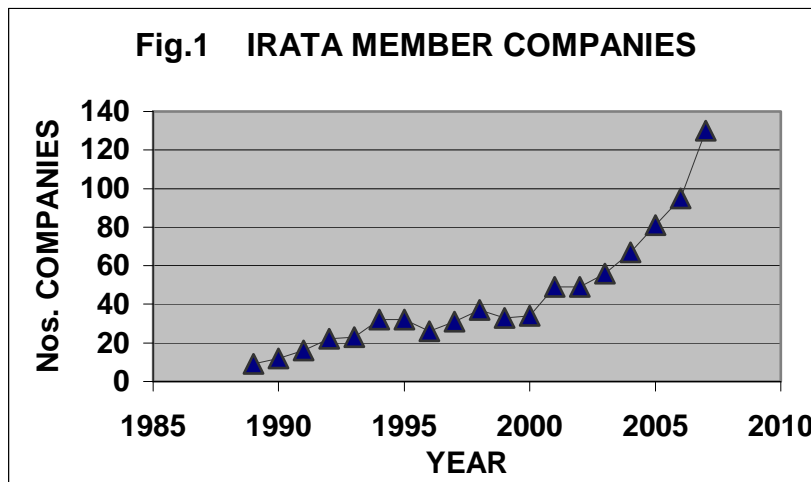
Members employment submissions were compiled and supplied on a spreadsheet by IRATA Administrators and are shown in Tables 2 and 3. Paper copies of all 020R and 021R forms submitted were also supplied. Member companies are not identified in any part of the analysis.

The report is arranged with figures, graphs and minor tables incorporated within the text to which they apply. Tables of some data are included at the back of the report. It is not reasonable to provide all data used in tabulated form; spreadsheets have been used for analysis of both employment and accident/incident data.

The report first considers overall employment figures, followed by examination of accident and incident data before finally comparing IRATA incident rates with those of previous years and other industries.

2. IRATA MEMBERSHIP

The total number of companies registered to April 2008 was 130, an increase of 35 over the 95 for the previous year. The graph below shows the increase in membership since 1989:

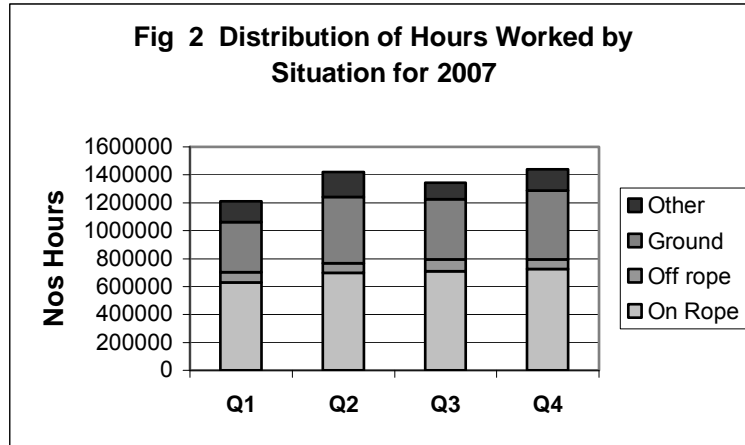


3. EMPLOYMENT STATISTICS FOR 2007

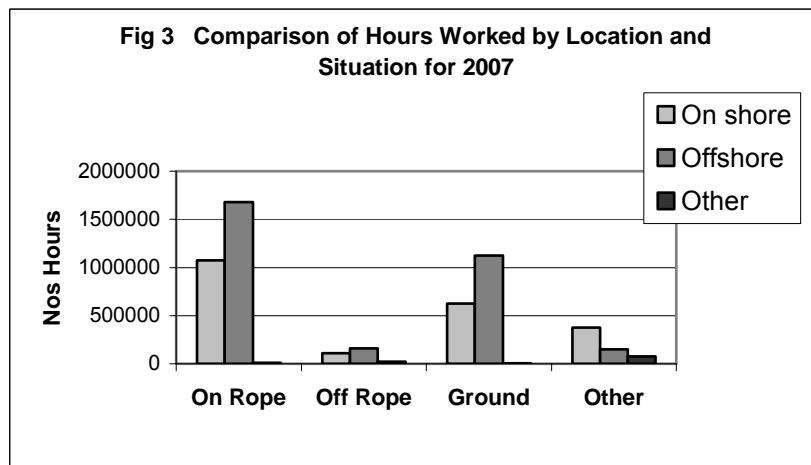
The potential maximum number of employment submissions for 2007 was 446 (allowing for part-year joining companies). Actual submissions up to 17 April 2008 were 407, a 91% submission rate. Although many member companies are not UK registered, submissions do not detail whether work was carried out in the UK or abroad. This report therefore examines total figures as it is not possible to differentiate between work in the UK and abroad with any accuracy. This also applies to accident/incident data. As will be noted later, this may have an impact when comparing IRATA incident rate data with UK HSE figures.

3.1 Overall Employment and Hours Worked

Total hours worked worldwide in 2007 was 5,417,123. The breakdown by quarter is shown in Fig.2 below. This total is an increase of over 43% on last year's total of 3,776,472. It is slightly higher than would be expected from a simple pro rata 37% increase due to membership increase over the period. The bar chart shows a small increase after the first quarter, thereafter running at about 1.4 million hours per quarter. Fig 2 also shows the breakdown between various work situations. 'Ground' includes any secure area and 'Off rope' involves working at height but not on ropes. 'On rope' working accounts for just over 50% of all reported hours.



The breakdown can also be made combining Situation (i.e. On rope, Off rope etc) and Location (On shore, Offshore and Other):

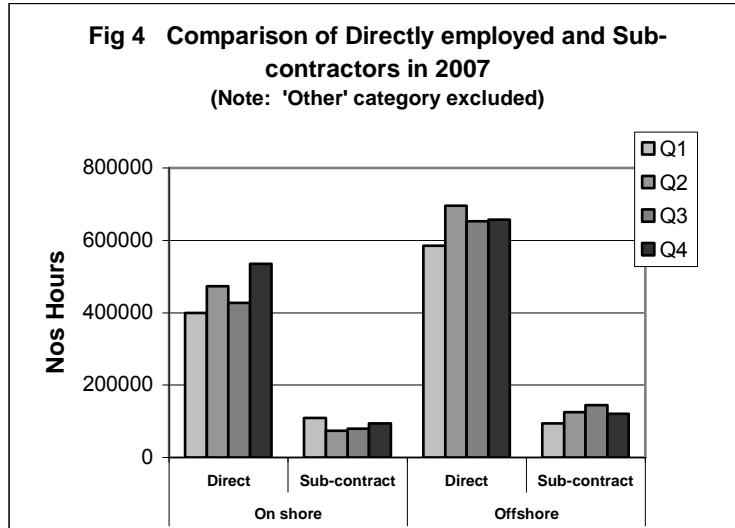


For simplicity of presentation the quarterly breakdown has been omitted and only totals for 2007 are shown in Fig 3.

As expected, offshore working predominates with total hours of 3.11 million hours (57.4%). On shore working accounted for 2.19 million hours (40.4%) with the residue as 'Other' (2.2%). The ratio of on to offshore working is virtually the same as for 2006.

3.2 Directly Employed v Sub-Contract

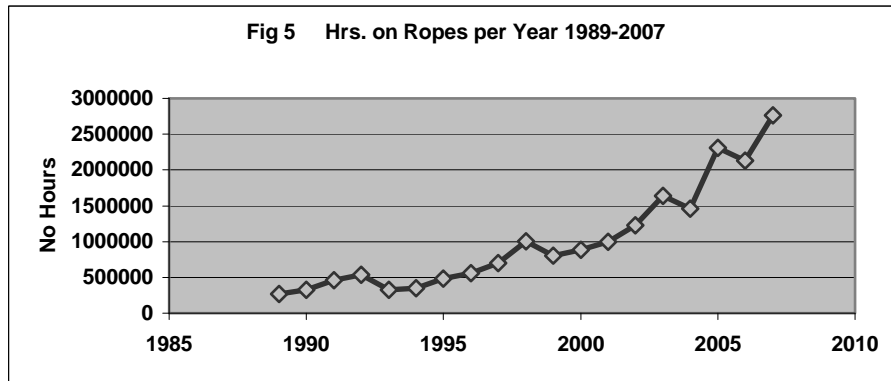
The somewhat 'fussy' chart below shows the comparison between the directly employed and sub-contractor hours for both on shore and offshore work. The 'Other' category has been excluded as it accounts, in total, for only 95,745 hours.



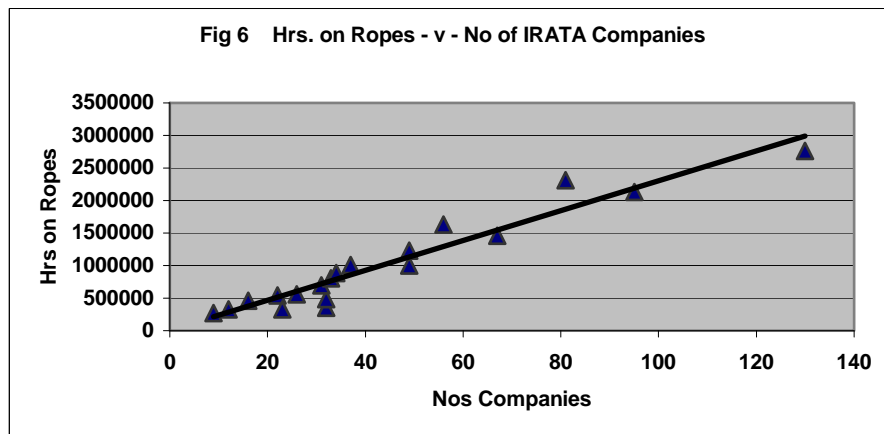
Two primary conclusions from the chart may be deduced. Firstly, the proportion of sub-contract work is similar for both on and offshore, being roughly 15-25%. Secondly, there is no clear pattern of employment change quarter to quarter. This may be due to increasing membership as the year progressed, hence increasing hours reported obscuring or distorting any possible trends.

3.3 Comparison of Hours on Ropes with Previous Years; Average Company Workforce

Taking only the hours on rope data from previous years the graph below (Fig 5) shows an almost identical trend to that of the number of IRATA member companies in Fig 1.



This relationship is confirmed by plotting Hours on Rope against Number of Companies (Fig 6 below). The trend line gives an average of about 23,000 hours per annum per company.



It should be noted that the historical data used for the comparison above only included work on ropes. Hence, the hours on ropes for 2007 is shown only as 2.77 million as against the total reported of 5.42 million hours.

If it is assumed that a typical working year for an individual is 220 days with an 8 hour day, this equates to 1,760 hours per annum per person*. Hence, 23,000 hours represents an average front line workforce of about $23,000/1,760 = 13$ per company. If due allowance is made for the total reported hours (as against just rope working) of 5.4 m hours, this rises to about 23 employees per company.

[Offshore hours are complicated by several factors. The usual rotation is 12hrs on/12 off per day and 2 weeks on/2 weeks off with a six week break per annum = ~ 1,900 hrs per annum. However, typical rope access working is carried out as project contracts or as intermittent core crew jobs. Therefore, a higher or lower figure could be expected. For the purpose of this report, however, no differentiation is made between on and offshore working hours].

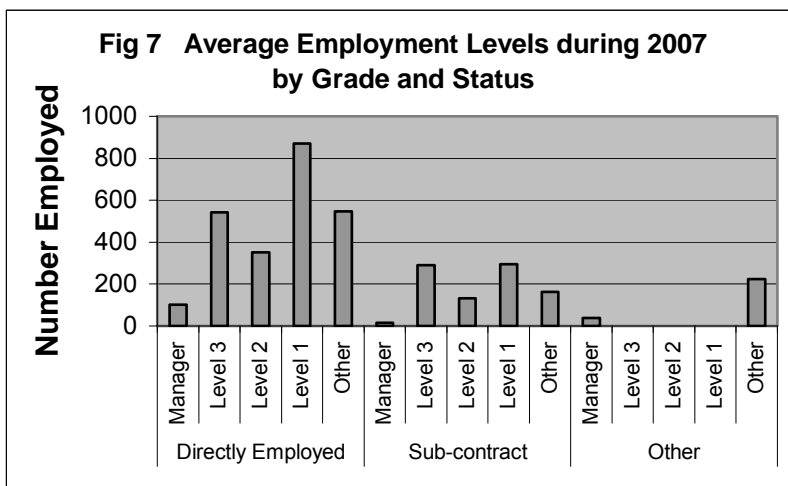
Similarly, the 3 million hours suggests a total front line workforce of $3.10^6/1,760 = \sim 1,700$, a figure close to that of 1,717 for Level 1-3 directly employed rope access workers given in 3.4 below. The overall figure of 5.4 million hours would indicate a workforce of 3050 on the same basis. This is somewhat less than the average figure of 3,574 given in 3.4 and probably reflects fewer hours recorded for individual sub-contractors and other support workers.

As in the previous report, it is suspected that there is a significant level of under reporting for none rope working hours. This arises from the number of submitted reports that give significant rope working hours but with few or no 'other' hours, a situation that is difficult to envisage. If under reporting is significant, it will have a pessimistic effect on data particularly when comparing incident rates against other industry figures where overall employment figures are used for the various work sectors.

*(It may be noted that the previous 2006 report used a figure of 2000 hrs per person per annum based on 25% of 8000 hours per annum).

3.4 Employment Levels During 2007

The quarterly total employment levels during 2007 varied from 3,494 to 3,666 per quarter with an average of **3,574**. The chart below shows the breakdown of the total according to Grade and Status of employees. The predominance of IRATA trained Level 1 – 3 in direct employment may be noted, representing 49.6% (1,766) of the total. Level 1-3 total averaged 2,453 (69%) during the year, broken down as Level 1 – 1,136, Level 2 – 484 and Level 3 – 833. Total directly employed (all categories) was 2,416 out of a total workforce of about 3,574. The lower number of Level 2s compared to Level 3s may be noted.

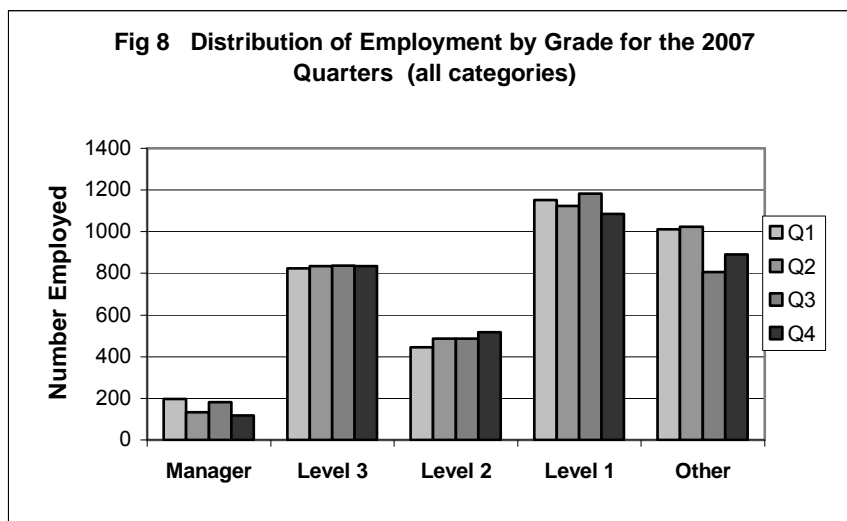


'Other' category relates mainly to technicians and other support workers with no formal rope access qualifications.

If it is assumed that all 'on rope' work is carried out only by IRATA qualified technicians then the figure of 2,453 employed above may be compared to the figure ~1,700 derived in 3.3 from recorded hours worked. The difference suggests a degree of 'under-employment' of available workforce hours or, more probably, a significant proportion of time spent on none rope work.

(Note: For many technicians, rope access work is not their only occupation. So, employment figures may not represent the number of actual individuals involved which may be much greater than the figures used here).

Examining the quarterly distribution of employment by grade (irrespective of employment status) reveals no particular or consistent trend except to note that the small fall in Level 1s may be partly explained by the 'promotions' to Level 2, a grade showing a steady rise from 446 to 506 going from Q1 to Q4.



At first sight these results appear to contradict the overall trend of increasing company membership as the year progressed. This would have been expected to be reflected in a similar rise each quarter in employment numbers as the year progressed. However, the number of missing returns from member companies also rose during the year, from just 4 in the first quarter to 18 in the final quarter (to April 2008). This would partly offset the increasing membership and may account for the apparent anomaly.

3.5 Training

As with the previous report, it is not possible to be definitive about the level of training from submissions. A sample of the first 50% of returns suggested about 200,000 hours of the reported 5,42m hours (~4%) was directly attributable to formal training and assessment. 'On the job' training hours are not given and no estimate or allowance can be made for this. Nevertheless, the 4% figure represents about 9 days per annum per person overall.

If the training estimate is limited to the Level 1 – 3 category workers only then the level rises to 200,000 hours for 2,433 which is 82 hours or 10 days per person which seems reasonable.

If the Level 1 – 3 employment figures in 3.4 above are taken and assumptions made for future transitions to higher grades it is possible to assess the likely minimum demand for training and assessments. If, say, it takes three years for a Level 1 or 2 to aspire to the next grade, then roughly 1/3 of all current Level 1s and 2s will require training and assessment in 2008. This is about 270 and 160 respectively. These figures will

necessarily be approximate not taking into account losses, new recruits for Level 1, refresher courses or the influx of new member companies.

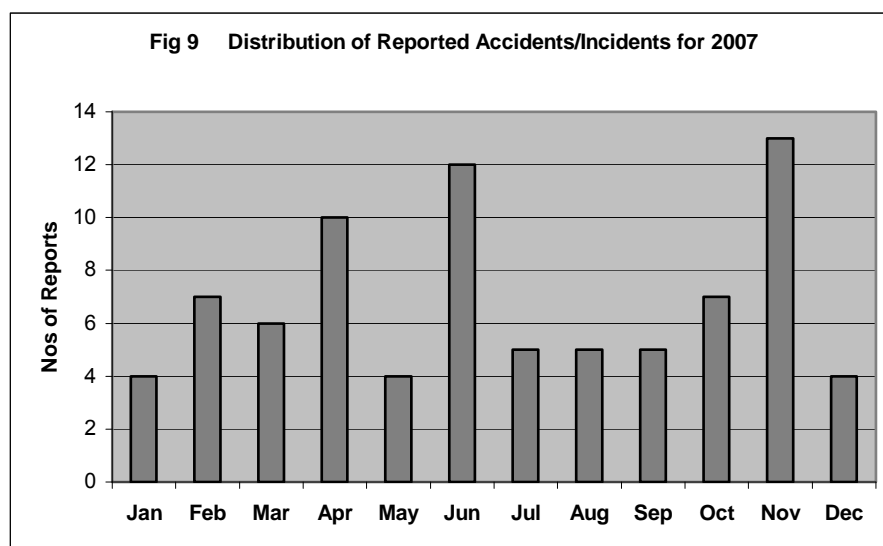
4. ACCIDENT STATISTICS FOR 2007

4.1 Submission Rate

The total number of accident/incident 021R reports submitted for 2007 was 82 from twenty companies with one company submitting 12. The number of reports implies a very favourable comparison with 104 reports in 2006, enhanced even further when the increase in working hours from 3.78 to 5.42 million hours is also taken into account. This assumes similar levels of reporting integrity to previous years – an assumption not supported by the gross variation in submission statistics of member companies summarised above – a point also made in the 2006 report. However, this problem also plagues HSE statistics.

The majority of reports (66 or 80% of the total) were related to employees with the remainder being sub-contractors (12%), third parties (5%) and two members of the general public (one being a baby in a pram and the other an inebriated man). The following breakdown of the data is based on the 012R form headings.

4.2 Date (i.e. Time of Year)

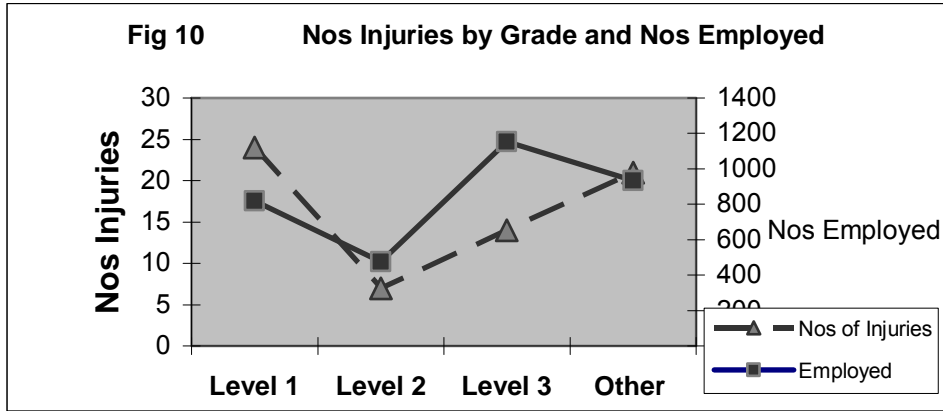


The graph above does suggest some high points for April, June and November. From the individual reports there are no obvious reasons for the distribution. For example, there was no single company or accident that accounted for a particular high monthly figure. Similarly, the employment figures do not show significant quarterly variations that could account for the above simply on the basis of busy periods. As will be noted later, weather had no impact on most incidents so a 'weather' factor is also unlikely to account for any variations. The workforce may have a simple explanation or the variations may lie within a normal distribution*.

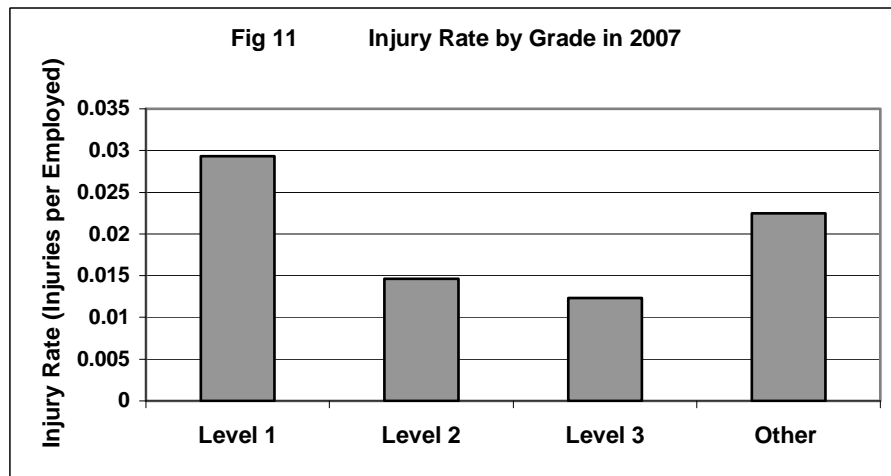
*(Statistical analysis gives a mean of 6.8 +/- 3 for 1.0 σ . The November figure of 13 lies within a 95% confidence limit (with $\sigma \approx 2$) and hence could be considered within a normal distribution of the mean. Put another way, the April figure would be expected once every 7 months, the June figure once every 2 years but the November figure would only be expected once every 4 years).

4.3 Grade of Injured Person (IP)

The chart below (Fig 10) shows the distribution of actual injuries sustained by the various grades and the numbers employed in the respective grades. The actual employed figures are taken from the quarterly averages in Fig 8.



Level 1s show a higher rate of injury than other categories; this is perhaps more clearly shown in Fig 11 below where the number of injuries is divided by the 'population' for the grade (i.e. average employed at the grade).



In either case it is clear that the most vulnerable grade is Level 1, not surprisingly. They are closely followed by the 'Other' category of primarily technicians (presumed not on ropes). As expected perhaps, the more experienced Level 2 and 3 operatives have about half the rate of the other two categories. It may reflect their 'supervisory' status, with lower exposure to actual risk on site and/or, their experience enables them to avoid accidents!

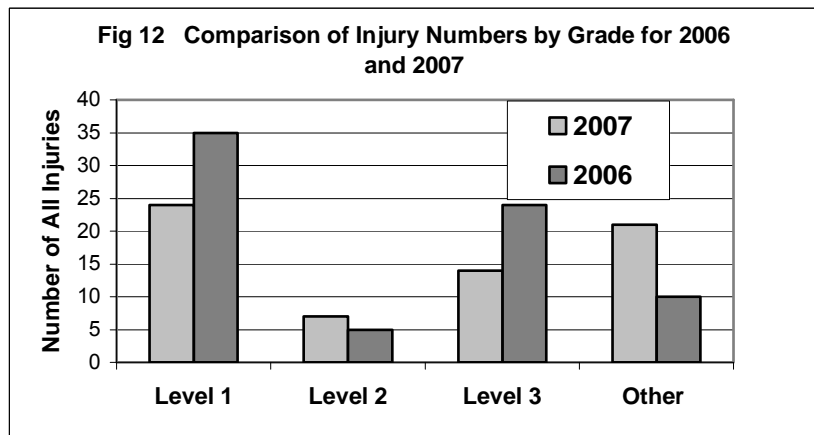


Fig 12 above compares the number of all injuries received in 2007 with those for 2006. Although 2007 generally shows a lower number of injuries for both Level 1 and 3, there appears to be an increase in 'Other' injuries. This may partly be accounted for by differences in reporting detail, in particular failure to provide grade detail of IPs. The

default used when no grade is given would be 'Other' and this is significantly higher in 2007.

Note that the above chart does not take into account the significant increase in hours worked in 2007 compared to 2006. This will be dealt with later when injury rates are discussed. As in 2006, however, the grade at most risk of injury was the Level 1 technician.

4.4 Time Lost

Total time lost was 192 days, or about 1500 hours. This represents less than 0.029% of the total 5.4m reported working hours in 2007. Hours lost in 2006 were 1,769 out of a total of 3.78m recorded hours or 0.047%. This apparently represents a significant reduction in time lost. A total of 151 days (nearly 80% of the total) were accounted for by only three accidents.

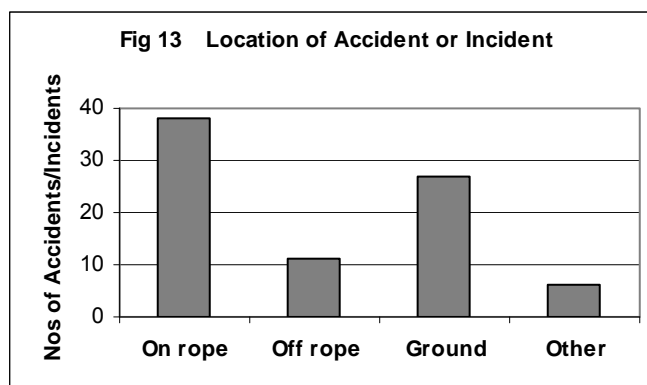
Perhaps more meaningfully, the 192 days was lost by a workforce of 3,574 i.e. 0.054 days per worker. This compares very favourably with 0.25 days per worker due to injury for the UK population overall (see ref to HSE website later).

However, it is considered that the reported time lost hours is significantly under reported. Some accident reports gave no time lost whereas, from examining the reports, it was clear some time must have been lost despite nil return. The sad extreme of this argument was the reported fatality for which no time lost was given yet the job was understandably stopped and presumably incurred significant time lost. Additionally, there is no specific reporting of time lost due to illness so comparison with the UK national figure of ~1.3 days per worker cannot be made.

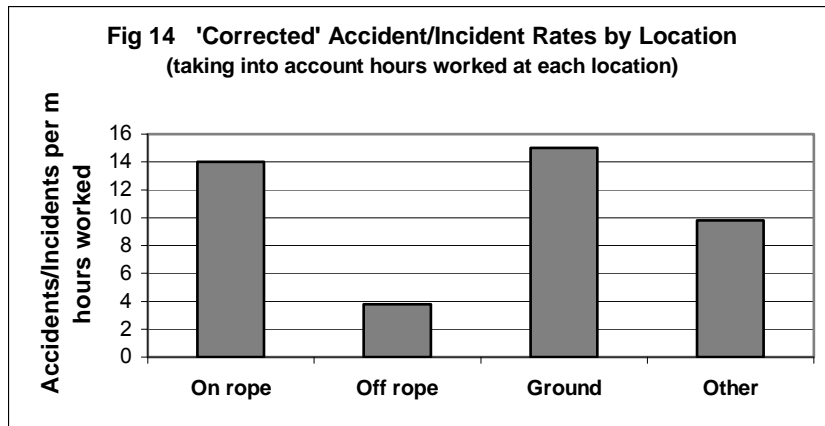
Nevertheless, the figures are impressive despite a clear but unknown level of under reporting.

4.5 Location of Accidents/Incidents

Categories provided in O21R forms were 'On rope', 'Off rope', 'Ground' (or secure place) and 'Other type of Work'. Some reports understandably used the category 'Other type of work' to describe the type of work (e.g. welding) rather than to describe alternative locations (e.g. workshops) as intended. In such cases and, where possible from report details, the 'location' was re-allocated if possible. The chart below gives the locations of all 82 reported accidents/incidents.



There is an almost even split between the total of accidents/incidents when on ropes (38) and all other categories taken together (44), suggesting that on rope working is significantly more hazardous than other locations. However, when the number of reported working hours for each category is also taken into account (see Fig 3 for hourly data) a slightly different picture emerges. In effect, the time of exposure at the different locations is taken into account by dividing the number of incidents or accidents by the hours spent at each location:

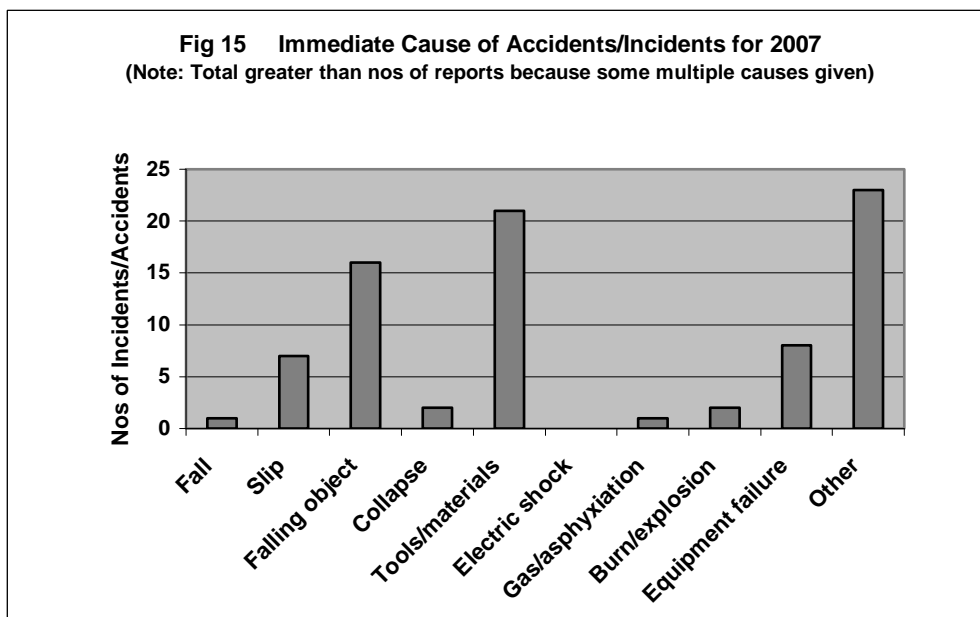


Now the 'on rope' rate is seen as a smaller proportion of the total (about 1/3rd) and accidents/incidents on secure ground becomes comparable with on rope working. A possible interpretation of these figures is perhaps 'off rope = off guard'? One lesson for supervisors and workforce is to remain vigilant at all times and not to ignore the risks when not on ropes. (Note that the y-axis is in nos. per million hours worked).

There is little point in analysing the 'major' and 'minor' categories of reportable injuries as together they totalled only 8 individual events. Two events occurred on rope, one whilst off rope and four on secure ground.

4.6 Immediate Causes of Accidents / Incidents

The chart below shows the breakdown of causes for reported accidents/incidents.



Dealing first with the 'Falls' and 'Slips' categories; some re-allocations to the latter category were necessary from submitted reports. It is usual to include slips and trips together with falls on level ground under this heading. To maintain consistency with this practice any reports giving slips or trips within the description and entered under 'Other' were allocated to 'Slips' as also were incidents on rope where slips or swings during manoeuvres were the primary cause of injury.

In terms of a 'real' fall (i.e. uncontrolled descent) only one incident was cited and with no serious injury. There were several cases of rope suspended workers slipping or swinging and receiving minor injuries as a result of colliding with structures. Perhaps some could have been avoided by closer attention to rope positioning or more appropriate footwear?

In terms of the industry that IRATA represents, this must be the most emotive category of all. Therefore, it should be reassuring that it remains at such a low level.

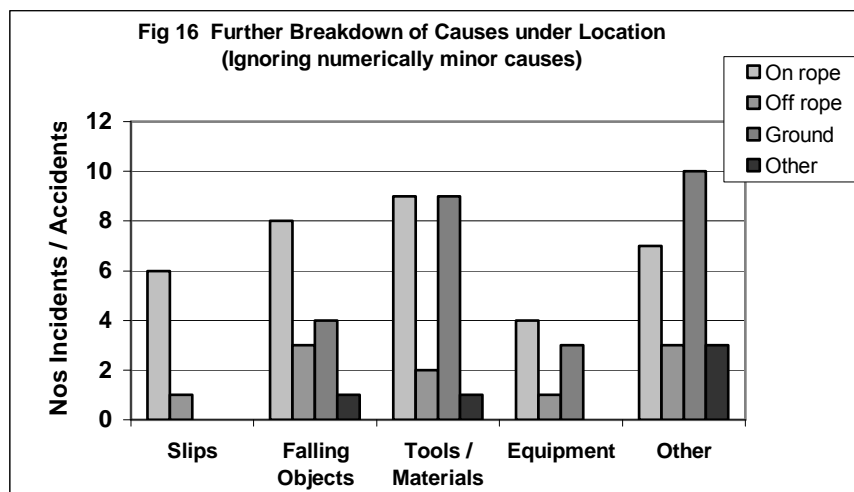
Falling objects remains a significantly high cause of accidents/incidents. Objects falling or dropped ranged from scaffold poles, window suckers to petrol, shackles and a coil of rope as well as the usual rocks and lumps of rust. In many cases dislodgement was caused by the technicians themselves. Pre-work start inspections must address the potential for dropped objects. *The vulnerability to dropped objects when working at height is obvious and requires continued vigilance to minimise potential dangers.*

The handling (or miss-handling) of tools was a prime factor in the largest single category of cause – ‘Tools and Materials’. Grinding, drilling and cutting operations often led to eye injuries. Being struck by tools or fluids associated with tools being handled was also a cause of several incidents.

Only two of the incidents were caused by someone other than the operative himself – a scissor lift operated by someone else, leading to part finger amputation, and an alarm sounding, causing an arm injury in trying to remove a breathing hood when air supply failed. Given the diversity of accidents/incidents within this category it is difficult to offer advice on prevention, despite it being the largest single cause category. Some mitigation, in the form of better or more effective eye protection, is dealt with later.

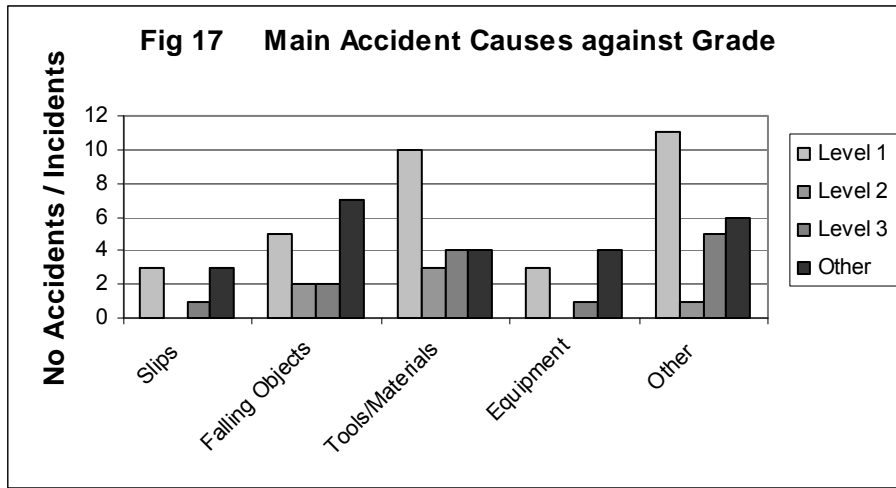
Not surprisingly the largest category was ‘Other’. This covered a multitude of sins, from sunburn, dehydration and arc weld flash to numerous strains and sprains. However, of the 23 reports, 12 contained an element of manual handling and this will also be considered later in the report.

It is tempting to further breakdown causes and examine them under different headings such as ‘Location’ as in the chart below (omitting the smaller numerical causes in Fig 15):



This chart suggests that the majority of slips, trips and falls and incidents due to falling objects occurred whilst working on ropes. However, a significant proportion of incidents involving tools, materials and other causes occurred whilst on secure ground. Put another way, just as many incidents are likely to occur off rope and on secure ground as when on rope – although the prime causes may be different.

Thus, just as much emphasis should be put on avoiding problems when off rope and on secure ground as when ‘on rope’ if the overall incident rate is to be reduced further. The apparent dangers surrounding ‘on rope’ working, however, will always attract a naturally appropriate level of care and attention by all concerned. It must remain of paramount concern to the industry from a public perception point of view.



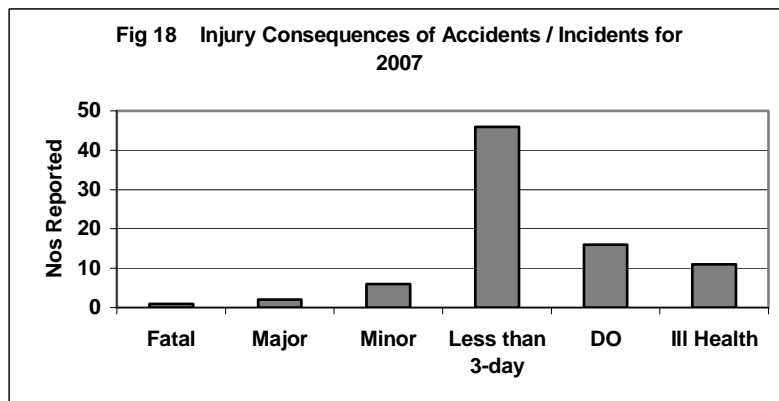
The same causal data can be interrogated by reference to the grades of affected personnel (Fig 16) for the more common causes. As expected from previous data, the Level 1 operatives predominate. The two 'highs' for the Level 1s were 'Tools/Materials' and 'Other' with 'Falling objects' also a significant cause of incidents. Again, 'Other' covers several unrelated miscellaneous causes.

The danger of 'over analysing' such sparse data, however, is that the point is quickly reached where individual items become significant and statistically meaningful analysis is no longer valid. For example, in the chart above, it will be seen that even single events could change the apparent distribution of some categories significantly. Added to this problem, reporting variables may further distort analysis conclusions if based on such limited data. These limitations of analysis emphasise the value of a high return of incident reports, particularly a 'near miss' category which would normally be the largest source of data.

Although in most cases it might be politely suggested that 'poor individual work practice' was to 'blame' for the accidents or incidents above, there must inevitably be elements of planning and supervision failure also contributing to the cause(s). In some reports, such factors were noted under 'Remedial action taken'. In many of these reference was made to immediate corrective actions, modification of work practices, further 'training', reminders at toolbox talks and use of risk assessments. Rarely was any more fundamental form of corrective action noted.

4.7 Injury Consequence of Incidents and Accidents

The 82 incident / accident reports are shown in Fig 18 under injury consequence categories. A common submission error was to categorise an incident under 'minor' when no actual injury was sustained.



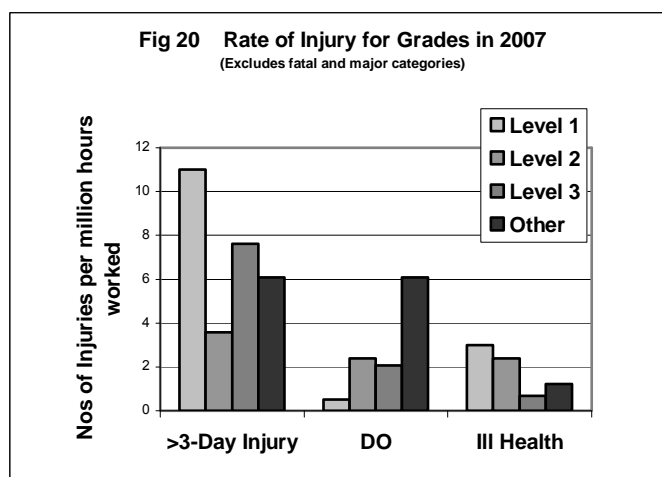
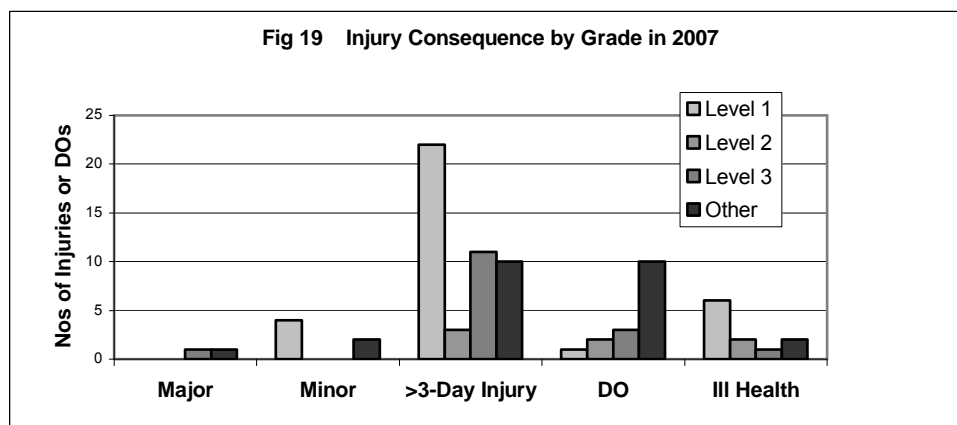
The predominating category was clearly 'less than 3-day injury', accounting for 55% of the total of all 82 incidents. The Dangerous Occurrences category of events, defined by RIDDOR, also shows a significant level of reporting.

The fatality, although included for accuracy, was an unfortunate person suffering a heart attack; it was clearly stated to be unrelated to actual work at the time of the attack. The two 'major' incidents involved a crushing injury during crane lifting operations and a hand injury caused by operation of a scissor lift platform.

Predictably, the greatest incidence of injury occurs to the Level 1 technicians (Fig 19). The reporting level for dangerous occurrences for this same grade is the lowest of all. Given the high rate of 3-day injuries to Level 1s, it might be expected that a significantly high level of DOs should also be reported for this grade.

The numbers in Fig 19 do not take account of the 'hours at risk' for the various grade categories. For this it is necessary to divide the number of injuries or incidents by the work hours. Whilst these figures are not supplied it is possible to estimate them from the employed levels. The average quarterly employed levels by grade (see Fig.8) were multiplied by the 1,760 hours per person per annum to derive the chart below (fig 20). For ease of comparison the charts are placed together.

It will be noted that the y-axis units are given in number of injuries (or incidents) per million hours worked. The Fig 20 chart omits the fatal, major and minor injury categories as the numbers involved are very low.



The noticeable 'smoothing out' between the various categories going from Fig 19 to Fig 20 reflects the difference in 'time at risk' of the grades. However, the Level 1 operatives remain at nearly twice the risk of a 3-day injury compared to any other group but, again, with the apparent anomaly of the fewest reported dangerous occurrences. This 'double

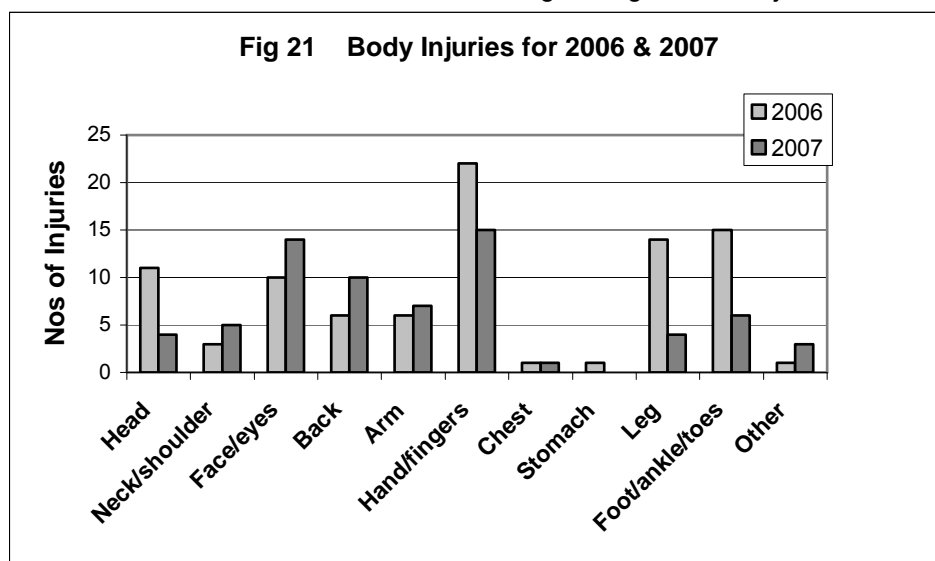
the risk' for Level 1 was also reported for previous years in the 2006 report as was the higher incidence of injury for Level 3 compared to Level 2 operatives.

No explanation can be offered for the higher incidence of DO reports for both Level 2 and 3 compared to Level 1 except possibly under reporting.

The relatively high number of 'Other' category injured may also be noted. In many cases of the DO category as no one was injured the grade of person is not given. For example, one report noted a damaged rope spotted by a Level 3 during pre-work inspection; no grade of person was affected directly. In cases of actual injury, either grade was not given (and hence allocated to 'Other') or the person injured was not IRATA qualified.

4.8 Body Part Injuries

The body part injuries sustained during 2007 are shown in Fig 21 together with those for 2006. The totals were 69 and 90 respectively. The profiles are broadly similar with the 2007 figures generally lower. The exceptions are injuries to face and eyes and back. Together with hand/finger injuries, these are the major injury categories. The significant reductions from 2006 occurred to head, hand/fingers, leg and foot injuries.



However, injuries to eyes and back increased. Of the 14 face/eye injuries, seven occurred on secure ground and five 'on rope'. Not surprisingly the majority of back injuries (6) occurred whilst 'on rope'. Hand injuries were more dispersed with four occurring 'on rope' and also 'off rope' and six on secure ground.

The number of eye injuries is of concern. Nine of the 14 events involved ingress of foreign materials into eyes. In most cases more effective eye protection would have mitigated or prevented injury. This is one specific area where injury reductions could be made by selecting and using more appropriate and effective eye protection.

Although the reduction in injury overall appears relatively small from 2006 to 2007, it should be recalled that the overall work hours increased from 3.8 to 5.4 million hours. A truer comparison could be made by applying a correction factor of 5.4/3.8 or 1.42 to 2006 data.

Unfortunately, the injury categories do not precisely coincide with those used by HSE; however, for those that do (units in injuries per 100,000 workers) and using IRATA average workforce of 3,574 to obtain equivalent figures):

	IRATA	HSE data
➤ Back injuries	280	500
➤ Neck/Arms	336	450
➤ Legs	112	250

4.9 External Factors

Fig 22, although showing somewhat erratic results year by year*, does show an overall downward trend in incident rates. For the last five years this has been held in the range 1-2 incidents per 100,000 hours whilst working on ropes. This is almost a 'step change' from the figures of 3-5 incidents per 100,000 hours for the previous years. However, the erratic nature of historical results warns against the temptation to compare 'year on year' results too closely, although for the earlier years this was largely a consequence of handling small numbers.

From Table 1, the rate for non RIDDOR incidents was 1.15 (1.41 for 2006) and 0.07 for RIDDOR reportable accidents (0.05 in 2006), remembering that this is for on rope working only.

*Analysis of IR figures of all accidents and DOs for 1989-2007 gives an average of 3.46 +/- 0.96 incidents per 100,000 hrs. The figure for 2007 of 1.22 would occur once in about 80 years if a normal distribution operated. Therefore, it is safe to assume that there has been a 'step change' in the incident rate in recent years unless other factors have influenced the figures such as change in reporting.

5.2 Basis of Calculations for Comparison of IRATA Data

Although historically and understandably there has been emphasis on the data for on rope working in isolation of the other categories, this analysis will continue using total working hours for two reasons. Firstly, as Figs 13 and 14 show, work off rope, on secure ground and other working accounted for as many hours collectively as that of on rope working in isolation. Secondly, in order to maintain consistency with general accident/incident reporting practice elsewhere, particularly UK HSE, all working hours should be considered collectively including those of office and support staff.

It is also necessary to change the units used, moving from 'per 100,000 hours' to 'per 100,000 employees'. Thus, for the annual total of 5.42m hours, numbers of incidents/accidents are multiplied by $(100,000/5.42 \cdot 10^6) \times 1,760 = 32.5$.

An alternative method is to simply take the employment numbers (e.g. Figs 7 & 8) and apply a multiplication factor to accident and incident data to reach 100,000 employees:

Average employment (from quarterly figures) = 3,574 employees
To convert to 100,000 employees x by $100,000/3574 = 28.0$

This figure assumes 100% employment and includes sub-contractors; therefore, in reality, a slightly higher figure might be expected. Bearing in mind the approximations used for both calculations, it seems prudent to select a figure between the two – the mean would be **30.3** and this figure will now be used to convert IRATA accident figures.

5.3 Comparison of IRATA Accident and Incident Data with UK HSE Data

The UK 'HSE website key figures for 2006/07' data for various industries are tabulated below and shown against IRATA converted figures. The significantly lower figures for IRATA companies is clear, being only about 1/2 to 1/4 that of other related industries in both major and minor injury categories.

(Ref. www.hse.gov.uk/statistics/overall/hssh0607.pdf).

Industry	Major Injury	Minor (>3-Day injuries)	Total (incl fatal)	LFS Totals
Agriculture, Forestry & Fisheries	191	368	565	1960
Extractive and Utility Supply	247	857	1109	
Manufacturing	176	748	926	1310
Construction	295	566	865	1580
All Industries	107	428	536	1000
IRATA	61	182	273	273

(All figures in number per 100,000 employees. Fatality incorporated in 'Total' column).

By any yardstick, these must be considered impressive figures, particularly bearing in mind that the degree in under reporting via RIDDOR could be ~50%. Although some under reporting may be expected in the equivalent IRATA data, it is unlikely to be as high as that suggested for national figures. Some caution should be applied to the IRATA data, however, because of the sensitivity to even single events. It will be remembered that the multiplication factor for the annual total hours was 30.3. Thus, a single event represents 30 'points' in the IRATA data within the table.

It is noteworthy that the HSE overall industry figures for major injuries have shown only a modest fall over the last 10 years, going from ~120 to the latest 06/07 figure of 107 per 100,000, a fall of about 10%. The equivalent fall for IRATA companies over the last 10 years is about 60-70% overall. Additionally, the average Labour Force Survey (LFS) average figure is virtually double the HSE figures shown in the last column, although this has shown a 50% drop over recent years. On a comparison basis with LFS data, the IRATA figure of 273 injuries per 100,000 employees is similar to that for those employed in Finance and Business (320) and well below for those employed in education (550) or hotels and health/social work (~980).

The difference narrows somewhat when 'All Industries' HSE figures are compared with IRATA data. But these overall figures include a large population of 'low risk' workforce which has a strong tendency to bring down the average figure. Nevertheless, the IRATA figure remains well below even these figures.

As for possible explanations for the significantly better accident and incident figures enjoyed by IRATA companies, there are probably several coincident factors at work. Firstly, the degree of training and close attention to development of work systems and procedures may be noted. Secondly, the emphasis on adequate and sufficient supervision by experienced personnel at the work site at all times must also be a positive factor (note the relative numbers of Level 2/3 to Level 1 technicians). Both of these factors are backed up by a strong assessment organisation and method. However, perhaps it is the overall quality of the workforce itself, at all levels, that is a major factor.

The single fatality in 2007 is recorded within the overall total figure, as for other industry figures. For completeness, the Dangerous Occurrences (DOs) figure is 490 and None Reportable Accidents 1,407 per 100,000 employees, figures that still compare favourably even with actual injury rates.

6 SUMMARY and CONCLUSIONS

The following are a number of points that summarise some of the key points from the report:

- There was a surge in membership (37% increase over 2006) and consequently working hours (43%) during 2007.
- The total hours 'on rope' for 2007 was 2.72 million hours, 51% of the total working hours of 5.42 million hours.
- Average workforce during 2007 was 3,574 with 2,416 directly employed.
- Average numbers of qualified IRATA technicians was:
 - Level 1 - 1,136
 - Level 2 - 484
 - Level 3 - 833
- It was estimated that formal training accounted for about 4% of working hours, about 9-10 days per annum per employee.
- Accident / incident submissions totalled 82, 69 involving personal injury. (Figures for 2006 were 104 and 90 respectively).
- Just as many accidents/incidents were likely off rope or on secure ground as on rope.
- The injury rate for Level 1 technicians was double that for Level 2 and Level 3 technicians with 'Other' category workers intermediate between them.
- Time lost due to accidents was clearly under reported. Figures supplied suggested a rate of only 0.05 days lost per employee per annum compared to a national average of 0.25.
- Primary causes of accidents / incidents were falling objects, use of tools/materials and miscellaneous other causes.
- Only one 'fall' was reported; no injury resulted.
- Level 1 technicians were consistently at greater risk of injury from these causes although 'Other' category workers were also prone to falling object injury.
- Main areas of injury were to eyes, back and hand/fingers. Eye injuries were just as likely to occur on secure ground as on rope. However, back injuries were more likely whilst on rope.
- Vulnerability to dropped objects remains a significant concern although the danger is not confined to on rope working alone.
- Manual handling, in the widest sense to include 'self manoeuvring' and introduced as an added category was a factor in 12 of the 82 reported incidents; only three occurred whilst on rope.
- For 'On Rope' working only, the calculated incident rates (IR) in number per 100,000 hrs were as follows (figs in () brackets for 2006 and [] brackets average from running totals 1989-2007):

○ None RIDDOR	1.15	(1.41)	[2.35]
○ RIDDOR Reportable	0.07	(0.05)	[0.20]
○ All accidents and DOs	1.22	(1.45)	[2.55]
- Comparison of overall accident and incident data with UK national statistics reveals IRATA rates to be well below the All Industry average rate and only about 1/2 to 1/4 that of related industries. Comparisons with Labour Force Survey figures demonstrate an even more impressive record for 2007.

Based on the data supplied and accident / incident reports submitted, it is concluded that:

- ❖ **Overall employment hours exceeded 5.4 million hours in 2007, of which over 2.7 million hours was for work carried out on ropes.**
- ❖ **The increase was largely due to an increase in IRATA membership, from 95 to 130 member companies in 2007.**
- ❖ **The trend in accident and incident figures for IRATA companies continued its decline.**

- ❖ **Based on reportable injuries, risk of injury to IRATA technicians remains well below that for 'All Industries' and approximately 1/2 to 1/4 that of related industries when compared to UK HSE data for 06/07.**
- ❖ **The historical improvement in overall standards was maintained in 2007, reflecting reliable and consistent control over work-related risks.**
- ❖ **Possible explanations for the continuing improvement in accident / incident statistics may include:**
 - **Disciplined training and work procedures**
 - **Rigorous and continuing assessment**
 - **Close supervision at worksites**
 - **High calibre of workforce generally**

7. RECOMMENDATIONS

- 1) IRATA companies should be congratulated for the continuing improvements in overall accident and incident rates achieved in 2007.
- 2) There is evidence for a significant degree of under reporting particularly of none 'on rope' working hours and 'days lost'. Companies should be urged to ensure adequate estimates for these are included in returns.
- 3) It is suggested 'Slips, trips and falls' and 'Manual handling' categories be added to 021R Forms.
- 4) Future trends suggest rapid increases in non-UK working. For the purposes of maintaining a common ground for comparing accident figures with UK HSE data, it is suggested that future submissions should differentiate between UK and non-UK working hours and employment (if possible).
- 5) Areas highlighted for closer attention by all concerned include:
 - a. Risks from falling objects – more stringent pre-work site checks suggested.
 - b. Use of better or more appropriate eye protection, particularly when using abrasive tools, on dusty worksites or when fluids are present.
 - c. Use of better or more appropriate PPE also applies to hand protection.
 - d. Risks of 'manual handling' strains and sprains, particularly off rope and on secure ground.
- 6) Finally, the figures show that work related incidents are just as likely when not on ropes as on ropes. Therefore, vigilance remains important at all times. Beware that 'off rope' doesn't become 'off guard'.

Table 1

Accident and Incident Returns for IRATA Companies 1989-2007

(based on Hours Worked On Rope only)

Year	No of Companies	Hours on ropes	Dangerous occurrences (DOs)	None reportable Accidents (NRA)	RIDDOR Accidents on ropes	IR for none RIDDOR incidents**	IR for RIDDOR accidents*	IR for all Accidents and DOs***
1989	9	267,504	4	8	0	4.49		4.49
1990	12	327,645	4	7	0	3.36		3.36
1991	16	457,928	5	17	0	4.79		4.79
1992	22	537,920	3	13	1	2.97	0.19	3.16
1993	23	327,000	0	21	0	6.42		6.42
1994	32	348,749	1	11	0	3.44		3.44
1995	32	484,285	8	16	0	4.95		4.95
1996	26	559,035	5	18	2	4.11	0.36	4.47
1997	31	699,688	13	11	9	3.43	1.29	4.72
1998	37	1,006,538	14	23	10	3.68	0.99	4.67
1999	33	803,365	10	29	3	4.85	0.37	5.23
2000	34	887,206	6	21	3	3.04	0.34	3.38
2001	49	999,010	15	25	4	4	0.40	4.40
2002	49	1,225,930	10	12	0	1.79		1.79
2003	56	1,634,482	1	9	0	0.61		0.61
2004	67	1,457,848	8	22	1	2.06	0.07	2.17
2005	81	2,311,265	9	10	3	0.82	0.13	0.96
2006	95	2,132,141	9	21	1	1.41	0.05	1.45
2007	130	2,765,483	11	21	2	1.15	0.07	1.22
TOTALS/AVERAGES		19,233,022	136	315	39	3.23	0.39	3.46
AVERAGE from running total						2.35	0.2	2.55

* - units for Incident Rates (IR) in number per 100,000 hours worked

** - (Col 4 + 5)/hours/100,000

*** - (Col 4+5+6)/hrs/100,000

TABLE 2 SUMMARY EMPLOYMENT DATA FOR 2007

(Derived from O20R Forms and supplied courtesy IRATA Secretariat. All units in hours.)

Working on ropes	Q1	Q2	Q3	Q4	TOTAL	Work at ground or secure floors	Q1	Q2	Q3	Q4	TOTAL
On shore						On shore					
Directly employed	220994	209254	225623	246700	902571	Directly employed	116266	150256	138785	158800	564107
Sub-contract	46407	40376	41763	45320	173866	Sub-contract	12414	8992	9671	32017	63094
Offshore						Offshore					
Directly employed	279475	343549	319177	330385	1272586	Directly employed	225907	306727	270735	288976	1092345
Sub-contract	80812	104091	120876	99878	405657	Sub-contract	3770	6247	10163	10713	30893
Other						Other					
Directly employed	52	1449	1809	2399	5709	Directly employed	88	870	1034	1173	3165
Sub-contract	1325	1231	868	1670	5094	Sub-contract	274	273	104	0	651
TOTAL	629065	699950	710116	726352	2765483	TOTAL	358719	473365	430492	491679	1754255
Working at height						Other type of work					
On shore						On shore					
Directly employed	21232	16287	23193	23894	84606	Directly employed	40696	96610	39852	105170	282328
Sub-contract	6079	6307	5705	5924	24015	Sub-contract	43937	18586	22864	11695	97082
Offshore						Offshore					
Directly employed	38440	32737	36307	27221	134705	Directly employed	41757	33008	26025	28995	129785
Sub-contract	1212	3450	12635	8092	25389	Sub-contract	8295	11644	99	1505	21543
Other						Other					
Directly employed	4756	1629	1335	212	7932	Directly employed	15204	21948	28416	6587	72155
Sub-contract	447	5449	5153	3962	15011	Sub-contract	1230	0	1484	120	2834
TOTAL	72166	65859	84328	69305	291658	TOTAL	151119	181796	118740	154072	605727
										TOTAL	5,417,123

TABLE 3 SUMMARY DATA OF EMPLOYED GRADES - 2007

(Supplied courtesy of IRATA Secretariat. Units of numbers employed by quarter).

	Q1	Q2	Q3	Q4	Average for 2007
AV NO OF PERSONS DIRECTLY EMPLOYED					
Manager	114	78	113	106	102.75
Level 3	518	533	538	580	542.25
Level 2	312	342	339	416	352.25
Level 1	869	897	852	868	871.5
Other	527	577	526	557	546.75
AV NO OF PERSON SUB CONTRACT OR SELF EMPLOYED (SC)					
Manager	40	11	8	7	16.5
Level 3	305	302	297	254	289.5
Level 2	134	144	148	102	132
Level 1	281	290	331	275	294.25
Other	209	248	85	112	163.5
OTHER NON-IRATA COMPANY EMPLOYEES					
Manager	44	44	60	5	38.25
Level 3	1	0	2	0	0.75
Level 2	0	0	0	0	0
Level 1	1	1	0	2	1
Other	276	199	195	221	222.75
				TOTAL	3574