Patterns in injury reporting

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Abstract

This paper considers injury data obtained from 16 anonymised maritime administrations. Evidence is examined of reporting biases which militate against the aggregation of different administrations' datasets. Some important dimensions of reporting bias are analysed. Taking two different large maritime administrations, evidence is presented indicating that injuries are systematically under-reported in general cargo ships, compared to other types of trades, and that injuries are systematically under-reported by some crew nationalities within a given maritime administration. The paper concludes that there is a clear need to invest in studies of the social processes of shipboard injury reporting, if we are to be able to interpret seafarer injury statistics.

Keywords: injury rates; reporting bias; injury reporting; secondary analysis

The occupation of seafaring is characterised by comparatively high rates of work-related deaths and injuries. In the last two decades a small number of studies have demonstrated that seafaring, alongside commercial fishing, is an occupation with one of the highest identified rates of mortality in OECD countries such as Denmark and the UK (Roberts and Williams 2007, Hansen 1996). However, robust data on seafarer fatalities and most notably work-related injuries has been scarce in relation to the global fleet and the international workforce.

The reasons for such scarcity become rapidly apparent when setting out to undertake research on seafarer deaths and injuries across the global fleet, as we have recently attempted in conjunction with a research project on perceptions of risk established as part of the programme of work undertaken at the Lloyd's Register Educational Trust Research Unit. Here we have been beset with problems of accessing data from Maritime Administrations (where some are reluctant to make such information public or may not collect/collate it at all) and in working with such data as have been kindly made available. The methods we have utilised in collecting data for this study have been previously outlined (Ellis 2007) however it is worth briefly rehearsing some of

the major difficulties associated with the analysis of seafarer injury and fatality data before briefly outlining the methods we have used in collecting the data underpinning this paper and discussing how that data which is available is best interpreted and understood.

Deficiencies in available data

In order to produce occupational rates of injury or fatality it is necessary to have access to relatively reliable information on both the numbers of reported injuries and fatalities at sea by flag (for example), and within a given time period. This is termed numerator data. However, it is also necessary to know the numbers of seafarers employed on ships carrying the specific flag concerned in the same time period. These are termed denominator data. The presence of both types of data allows for a rate to be calculated which can then be utilised in making comparisons between, or within, industries – for different vessel types for example, or for different flags. The problems in collecting such data in the shipping industry are both that there are considerable reporting biases apparent in the available numerator data (numbers of casualties), and that there is an absence of reliable denominator data - so that often the numbers of seafarers employed is not known and an estimate is established in its stead. This allows for the presentation of, at best, a patchy and somewhat unreliable picture of seafarer casualty rates.

Method

Fatality and injury numerator data were collected as part of a larger study which collected accident and incident data from maritime administrations (Ellis 2007). Such administrations are legally required to record all accidents and major incidents that occur to their flagged vessels, and thus were seen as a comparatively robust source of casualty data. The largest 30 administrations, as defined by gross tonnage, were sent questionnaires which asked about the type of casualty data kept, the nature of these

(i.e. casualty reports, statistics, tabulated), as well as whether the administrations would be willing to provide these data for academic research. These 30 administrations represented 87.5% of the world fleet's overall gross tonnage (Lloyd's Register Fairplay 2005). Of these,16 provided casualty data. In order to compare the data provided by the administrations the datasets were recoded to allow representation in a standardised format. This recoding related to incident types, rank of seafarers, and vessel types. Fishing and navy vessels were excluded from the datasets. Although data were provided for a large range of years, a common dataset was only available for a shorter range of 2000 to 2005. As a condition of their provision the source of data was anonymised, and is referred to by an alphabetical identifier.

For the present analysis, the 16 maritime administrations were re-contacted and asked to provide denominator data on their seafarer populations. Of the 16, seven provided this information. Information about the number of ships in the world fleet was obtained from annually published World Fleet Statistics (e.g. Lloyd's Register Fairplay 2005).

The interpretation of available injury data

When the data sent by the sixteen maritime administrations were considered in detail it was found that only seven provided data which could be used with regard to the reporting of seafarer injuries. Of these, four provided sufficient detail to allow us to categorise the information on injuries into different types corresponding with commonly utilised groupings, i.e. break, fracture, dislocation; bruising; burns; crush/trap injuries; cuts/piercings; electric shocks; strains, sprains, twists; loss of consciousness; other. The distribution of the reported injuries is illustrated in Table One which also includes the data available on numbers of fatalities for the administrations concerned in the same time frame.

Table 1: Injuries and Fatalities Compared Across Four Flags 2000-05

	Flag A	Flag B	Flag C	Flag D
Break, Fracture, Dislocation	26 (9.0%)	49 (36.6%)	9 (4.9%)	439 (25.2%)
Bruising	3 (1.0%)	14 (10.4%)		272 (15.6%)
Burn	15 (5.2%)	6 (4.5%)	6 (3.3%)	68 (3.9%)
Crush or Trap Injury	12 (4.1%)	12 (9.0%)		116 (6.6%)
Cut or piercing injury	22 (7.6%)	27 (20.1%)	1 (0.5%)	279 (16.0%)
Electric Shock		1 (0.7%)		8 (0.5%)
Strain, sprain or twist	6 (2.1%)	15 (11.2%)		456 (26.1%)
Unconscious	1 (0.3%)	5 (3.7%)		37 (2.1%)
Other	5 (1.7%)	3 (2.2%)		
Fatalities	**200 (69.0%)**	**2 (1.5%)**	**167 (91.3%)**	**70 (4.0%)**

The major conclusion which can be drawn from these data is that there is considerable variation in the practice of recording/reporting injuries across maritime administrations. The ratio of injuries to fatalities might be expected to vary across administrations for any given year, however, it could reasonably be anticipated that injuries would outweigh fatalities where injuries are being reported in any kind of systematic fashion. However, these data indicate that for two, of the four, administrations (A and C) numbers of reported fatalities are far higher than numbers of reported injuries with fatalities constituting 91% of all reports in administration C, and 69% of the total reports in administration A. This clearly indicates significant under-reporting of injuries in these administrations which may only record injuries associated with major incidents (where fatalities have occurred alongside non-fatal injuries for example), or may only record those injuries deemed to be most serious. Such variations in recording/reporting practices make it impossible to aggregate data across administrations, as like cannot be compared with like, and the data are clearly unreliable. However, data produced by individual maritime administrations may be analysed to consider, for example, variations in patterns over time, variations in reporting by rank and variations in reporting by nationality.

When we considered trends in data over time across individual maritime administrations we were able to identify a tendency for injuries and fatalities to reduce over the period. In one Administration – E – these trends for injuries and fatalities were found to be statistically significant (see Table Two).

Table 2: Seven-year Trend Data in Injuries and Fatalities in Flag-State E

	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Seafarer Population	23,470	23,225	22,282	21,836	21,683	22.343	22,995
Injuries	912 (3.9%)	778 (3.3%)	881 (3.6%)	774 (3.5%)	635 (2.9%)	444 (2.0%)	422 (1.8%)
Fatalities	22 (0.1%)	17 (0.1%)	13 (0.1%)	11 (0.1%)	28 (0.1%)	9 (0.0%)	5 (0.0%)

In another administration (D) where we only have denominator data (that is, numbers of seafarers data) for those seafarers based in the home state, home-state officers were found to have significantly lower injury rates over the six-year period 2000-05 than home-state ratings (see Table Three).

Table 3: Six-Year Trend Data in Injuries by Rank 2000-05 in Flag-State D (Home State Seafarers Only)

	2000	**2001**	**2002**	**2003**	**2004**	**2005**
Total officers & cadets	14,080	13,900	14,070	14,580	14,670	14,950
Total ratings	10,800	6,680	9,510	10,490	10,270	9,320
Officer Injuries	1 (0.0%)	0 (0.0%)	1 (0.0%)	1 (0.0%)	2 (0.0%)	8 (0.1%)
Ratings Injuries	10 (0.1%)	3 (0.0%)	10 (0.1%)	18 (0.2%)	32 (0.3%)	22 (0.2%)
Total Injuries	11 (0.0%)	3 (0.0%)	11 (0.0%)	19 (0.1%)	34 (0.1%)	30 (0.1%)

In relation to variations in injury rates according to nationality a debate between academics interested in such patterns has been on-going for some time and concerns the identification of apparently different rates of injuries across different national groups. These may be interpreted as 'real differences' in which case they are generally considered to indicate differences in risk taking behaviours (see for example Hansen 2008) or they may be considered to be manifestations of different reporting practices which might relate to considerations such as employment status (i.e. temporary as opposed to permanent contracts) and fear of job loss.

To shed further light on this issue we have examined the reported injuries for one maritime administration (E) over a seven-year period. In doing this we have considered reports of 'slips, trips and falls' against reports of all other injury types on the assumption that slips, trips and falls represent the least incapacitating category of injuries and are thus most subject to variations in self-reporting, i.e. these are the kinds of minor injuries most likely to go un-reported by seafarers. We have also compared two single nationality groups (home state and Filipino seafarers grouped separately) with all other nationals grouped together. Despite the fact that this analysis considers data where we know that we have a great deal of missing information we nevertheless feel that there is evidence that there are nationality-based variations in injury reporting: as a proportion of the total numbers of injuries they report, Filipinos and other nationalities both report significantly fewer slips, trips and falls than seafarers from the home (flag) state (see Table Four).

Table 4: 2000-06 Injury Rates by Reported Cause in Flag-State E, comparing Home-State-Nationals, Other Nationals and Filipinos

	Home-State	Other Nationals	Filipinos	Filipinos and other nationals combined
Slips, trips or falls on same level	538 (30.8%)	73 (19.5%)	138 (26.0%)	211 (23.3%)
All other injuries	1206 (69.2%)	302 (80.5%)	392 (74.0%)	694 (76.7%)

Such data do not necessarily invalidate the arguments mentioned earlier of Hansen and others that there may be cultural differences in risk behaviour between different national groups, but they do indicate that there are *also* systematic differences between national groups in their propensity to self-report injuries, particularly where these are less severe.

Such reporting biases were also manifestly present when we considered variations in injury patterns by ship type. Here, as with the maritime administrations, we see that whilst some ship types have predictable ratios of injuries to fatalities for others, the ratios are highly disproportionate and indicative of high levels of under-reporting in relation to injuries (see Table Five). We have compared general cargo, passenger/ro ro, tankers/OBOs and all other ship types (grouped) to facilitate analysis and it can be

seen that reports of injuries from general cargo ships disproportionately appear to represent fatalities (16%) and involve only a very small quantity (6.6%) of reports of minor injuries (represented by the separate consideration of strains, sprains, and twists). In contrast, the proportion of fatalities reported in relation to passenger/ro ro vessels is very low (0.79%) whilst of all reported injuries aboard these vessels very minor injuries (strains, sprains and twists) make up a considerable proportion of the total (30.1%) which is more in line with reasonable expectation. This indicates that aboard general cargo vessels there is a tendency to report only serious injuries and fatalities whilst this tendency is less pronounced for other vessel types (particularly passenger/ro ro vessels).

Table 5: Injury Rate by Reported Cause in Flag-State D, compared by ship-type

	Fatalities	**Strains, Sprains, or Twists**	**All other non-fatal injuries**	**Total**
General Cargo	17 (16%)	7 (6.6%)	82 (77.3%)	106 (100%)
Tanker (incl OBO)	4 (3.5%)	15 (13.2%)	94 (83.1%)	113 (100%)
Passenger & Ro-Ro*	8 (0.79%)	307 (30.1%)	702 (69%)	1017 (100%)
All other ship types	41 (5.9%)	127 (18.4%)	522 (75.6%)	690 (100%)

*NB data do not include information on passenger injuries. Passengers are not included in the dataset.

Conclusion

In understanding patterns of injuries amongst seafarers it is essential to recognise that any injury data collated by maritime administrations are subject to potentially significant reporting biases given the fact that seafarers (either those injured or their seniors) are able to decide whether or not to report injuries to maritime administrations and may choose not to do so. Reasons for failure to report might include: a fear of repatriation by their company; a fear of not being re-hired by their company; a fear of being 'blamed' for causing their own injury – of getting 'into trouble' and so forth.

This account has demonstrated that whilst there may be very real differences in patterns of seafarer injuries which could possibly relate to different trades, jobs, risk practices, and so forth, the currently available data cannot robustly support such interpretations given that reporting biases are as demonstrably high as we have shown them to be.

The social processes of shipboard injury reporting and the individual requirements and practices of maritime administrations are inevitably complex and quite unstudied, but there is a need to invest in such studies if we are to be able to better interpret seafarer injury statistics in the future.

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