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The Costs of Poor Safety in the Workplace

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I INTRODUCTION

Over the last two years we have conducted research on the costs of accidents in the workplace, monitoring 14 firms in the Republic of Ireland (RoI) over a 12 week period in 1995, and 11 firms in Northern Ireland (NI) over a 12 week period in 1996. Using a standard Report Form (Appendix I)¹ which was filled in by the appropriate manager for every accident over the period, we have been able to obtain interesting case study information on the nature of the costs of accidents. In this paper we discuss costs of accidents in general (Section II), then describe our research methodology (Section III). The next section, section IV, presents the information on the costs of accidents arising from the research, in three sub-sections: total costs, direct vs indirect costs, and insured vs uninsured costs. In section V, we briefly summarise some of the recent literature on the prevention of accidents. Finally, section VI provides a brief conclusion.

II COSTS OF WORK RELATED ACCIDENTS

The data we have obtained are unfortunately not amenable to the extrapolation that would give us national figures on the costs of accidents. This is because the sample of firms we monitored was too small to be representative of all firms in the two economies. It is more appropriate therefore to view the results as a series of case studies.

There are a number of estimates of aggregate costs of work related accidents and ill health, both for Europe and North America. It has been reported, for example, that occupational accidents and diseases cost some NOK40 billion (IR£3.7 billion) per year in Norway (Rognstad, 1994). In the USA the National Safety Council estimates the total work-injury costs to have been over \$112 billion (IR£68 billion) in 1995 (Hoskin, 1996). Research on work related injury and fatality statistics in Alaska has shown that they cost, in that state alone, \$442 million (IR£267 million) in 1993 (LaBar, 1994). In Canada, indirect costs of injuries in the workplace amount to \$20 billion (IR8.5 billion) each year (Matrosovs, 1992). Research in North America

¹ adapted from that developed by the HSE (1993)

Suggests that these indirect costs can be from three to ten times the direct costs (LaBar, 1994)².

Not all the above figures are comparable with one another. To complicate matters further, another way of measuring costs of work related accidents and ill-health is to focus on a particular type of occupational ill-health. A study along these lines found that, in the United States, “Headache pain alone costs industry roughly \$57 billion [IR£34 billion] annually due to ineffective working time, missed workdays, and medical expenses” (Edwards, 1995)³.

Closer to home, work by the Health and Safety Executive (HSE) in Britain estimated that accidents in the workplace (including those that did not involve personal injury) and work related ill health cost employers between £170 and £360 per person employed, or up to £9 billion a year in total (Davies and Treasdale).

The evidence is clear that work related accidents impose high costs on firms. These costs have always been high. There are two additional reasons why research on the costs of accidents is particularly appropriate at this time. First, increasing European integration and globalisation in general have intensified competition for virtually all industrial and service sector firms in Europe⁴. This intensification of competition has resulted in many firms reducing employment by removing “non-essential” employees from the payroll. Safety and health staff and programmes are often the first to be reduced in such circumstances (LaBar, 1993)⁵. Second, new forms of work organisation have changed the structures of “best practice” firms, generally flattening organisation hierarchies and reducing middle management (Jacobson, 1996). Safety and health experts are concentrated in middle management (LaBar, 1993), and are therefore again particularly vulnerable to the effects of these changes.

All this suggests that the issue of occupational safety and health needs to be kept high on the agenda of public policy. Identifying the costs of accidents, and showing

² Indirect costs were on average more than ten times direct costs in the RoI study, and just under five times direct costs in the NI study.

³ See also Greenberg et al (1995), who have developed a model to calculate the workplace costs of chronic disease.

⁴ The single market process has been argued to be particularly burdensome for small and medium enterprises (Smallbone et al, 1996).

⁵ Firms often respond to increasing competition by shortening their time horizons, for example reducing investment. Jacobson and Mottiar (1995b) have shown that firms with long time horizons are

that appropriate strategies can reduce these costs, will help to add the economic to the legal and moral reasons for corporate action to prevent accidents at work.

III METHODOLOGY

The methodology we adopted in both studies was to select a number of firms, broadly representative both geographically and sectorally. We then wrote to them explaining the aims and objectives of the research, promising confidentiality, and inviting them to participate in the study. This participation involved completing the Report Form for every accident over a 12 week period resulting in a loss of time of over 15 minutes and/or a cost of over £5.

In the Rol study of the 54 firms approached, 14 agreed to participate. Among these 14 were a number of small firms which reported no accidents at all. In fact, only the five largest of the firms reported accidents. This suggested either that we had too few small firms in the study sample, or that the monitoring period was too short. In order to rectify this problem, we planned to increase the number of small firms in the NI study. The total number of firms initially approached was, at 102, nearly double that for the Rol study. We sent a similar letter and explanation, and included in addition a letter from the Health and Safety Agency in Belfast urging participation.

The response rate in NI was unexpectedly low with only eight firms responding positively to the initial letter. Follow up calls, letters and faxes resulted in another three firms agreeing to participate. The original intention was to have a larger sample, and the poor response particularly from small firms was likely to - and in the event did - result in no accidents being reported by small firms. Nevertheless, we felt on balance that firms that had to be cajoled into participating may be less likely to supply the information required regularly and accurately and may therefore skew the results; it would have resulted in under-reporting of accidents. On the other hand, the fact that most of the firms in the study - both in Rol and in NI - agreed quite readily to participate could have the opposite effect; it is possible that these firms, as those most interested in monitoring the costs of accidents are also those most conscious of accidents in the workplace. If this is the case, these firms are likely to have a better than average record (i.e. the results for the sample studied are likely to underestimate the actual incidence and costs of accidents in the work place in

far more likely to introduce programmes to prevent work related accidents and ill-health than those with short time horizons.

general). This was also true of the British study, in which, as its authors note, the firms they chose “displayed average or better than average health and safety performance in their industries” (HSE, 1993, p.4). It may well be, therefore, that the actual “costs of poor safety” are higher than those indicated in this paper.

IV RESULTS

We computerised the information obtained from the Report Forms and have data on the numbers and types of accidents, and the costs of accidents. Here we will report only on the costs, focusing on total costs, direct vs indirect costs, and insured vs uninsured costs.

A Total costs⁶

Table 1: Costs and number of accidents by company in Rol study

Company (Sector)	Total cost (£)	Total no. of accidents	Average cost per accident (£)
A (Engineering)	1,786.15	6	297.69
B (Construction)	970.06	3	323.35
C (Manufacturing)	1,062.54	28	37.95
D (Manufacturing)	13,486.00	30	449.55
E (Construction)	6,159.86	37	166.48
Total	23,465.23	104	225.63

As Table 1 shows, in the Rol study the five firms that reported accidents reported a total of 104, with a total cost of £23,465.23. The average cost per accident was £225.63 but this resulted from a lowest average of £37.95 for firm C and a high average of £449.55 from firm D.

In the NI study (Table 2), of the 11 firms monitored, seven reported a total of 47 accidents, costing a total of £4,847.04. The average cost per accident was £103.13, the range of averages being a low of £57.25 for firm C and high of £319.66 for firm G.

Table 2: Costs and number of accidents by company in NI study

Company (Sector)	Total cost (£)	Total no. of accidents	Average cost per accident (£)
A (Agri-food)	583.88	7	83.41
B (Agri-food)	192.04	1	192.04
C (Textiles)	629.73	11	57.25
D (Textiles)	1976.02	19	104.00
E (Construction)	97.80	1	97.80
F (Textiles)	408.60	5	81.72
G (Construction)	958.97	3	319.66
Total	4,847.04	47	103.13

Given the extent to which the number and severity of accidents will vary according to such factors as the nature of the production process and the size of the firm, what is interesting about the data from the two studies is their similarity rather than their differences. The low, high and overall averages are of the same orders of magnitude.

B. Direct vs indirect costs

The accident Report Form is structured in such a way as to enable us to distinguish between direct and indirect costs of the accidents reported. The Report Form is divided into three sections, two of which deal with the costs of the accident. Section two deals with time lost by employees and managers due to an accident while section three includes direct costs such as taxi fares, hospital charges, products and materials wasted, costs associated with improving the system or procedure to ensure such an accident does not recur. The section three, or direct, costs are all directly calculable in money terms, and are, as a result, the costs that firms are most aware of. Section two costs are the indirect or hidden costs of an accident; they are often not included in firms' assessments of the costs of accidents. The economic rationale for including indirect costs is that they are opportunity costs; time spent on accidents and their consequences is time that could have been spent on more productive activities.

⁶ We will assume throughout that the Irish pound and sterling are at parity.

i) Direct Costs

The reported direct costs of the accidents were much lower than the indirect costs. In the Rol study the average direct costs amounted to £21.67 per accident (£2,232 in total); in the NI study the average direct costs amounted to £17.67 per accident (£830.50 in total). In both studies a number of firms had no direct costs at all. The two most important components of direct costs are: a) taxi fares to the hospital and medical charges, and b) costs of work to improve system or procedure to ensure accident does not recur. In both the Rol and NI firms, accidents with the highest direct costs were those with significant work to prevent recurrence.

Table 3: Direct costs of accidents

Study	Total Direct Costs (£)	Avg. Direct Costs per Accident (£)
Rol	2,232.00	21.67
NI	830.50	17.67

ii) Indirect Costs

Indirect costs are the costs of work time foregone as a result of an accident. The Report form in Appendix I shows the categories under which this time is costed. The single most important category is, not unexpectedly, the injured persons' lost time as a result of the accident. In the Rol study this accounted for 85.7 per cent of the total time lost; in the NI study the time lost by the injured persons accounted for 71.5 per cent of the total. In both studies the proportion of the costs of time lost accounted for by the injured person was lower (Rol, 81.7 per cent; NI, 65.7 per cent), because the cost per hour of other time lost - e.g. time spent by management dealing with the accident and its consequences - is in general greater than the injured person's cost per hour.

Table 4: The Distribution of the Cost of Lost Time According to Activity, Rol

	Cost of time lost (£)	As % of total cost	Average cost of time lost per accident (£)
(a) Injured Person	17,338.72	81.7	166.72
(b) Management time	926.51	4.4	8.91
(c) Other	2967.50	14.0	28.53
Total	21,232.73	100	204.16

Tables 4 and 5 show the indirect costs of all the accidents in the Rol and NI studies respectively. Rather than emphasising the differences between these two tables, and considering them as indicative of the nature of the differences between workplace accidents in Rol and NI, it is appropriate to see the tables as indicative of a variety of possibilities, depending on the types of accidents, firms, and industries.

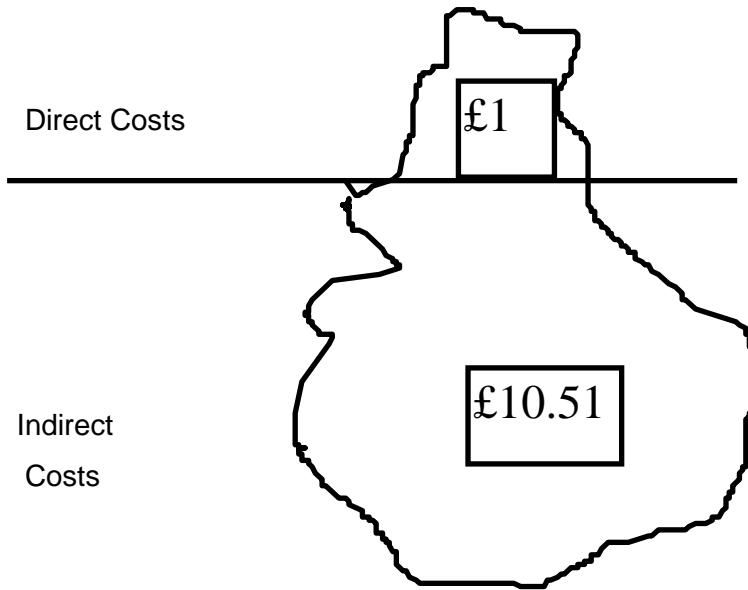
Table 5: The Distribution of the Cost of Lost Time According to Activity, NI

	Cost of time lost (£)	As % of total cost	Average cost of time lost per accident (£)
(a) Injured Person	2,638.33	65.7	56.14
(b) Management time	554.85	13.8	11.81
(c) Other	823.36	20.5	17.52
Total	4,016.54	100	85.46

iii) Accident Icebergs

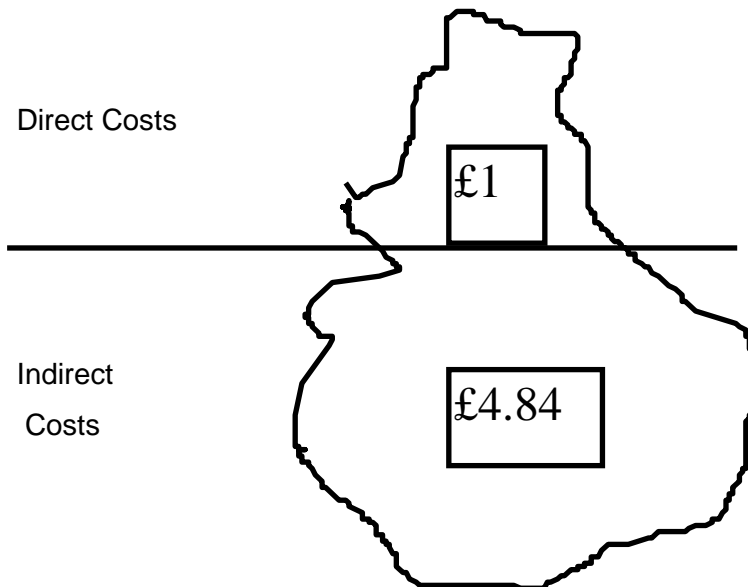
The notion of the iceberg, with only a small proportion above the water, is analogous to accident costs, with a small proportion of the direct costs above the line, and the majority, indirect or hidden costs, below the line. We present below accident icebergs for the Rol and NI studies respectively.

Accident Iceberg for all accidents during study period, RoI



The aim of the iceberg is simply to show the extent to which indirect or hidden costs exceed the obvious, direct costs.

Accident Iceberg for all accidents during study period, NI



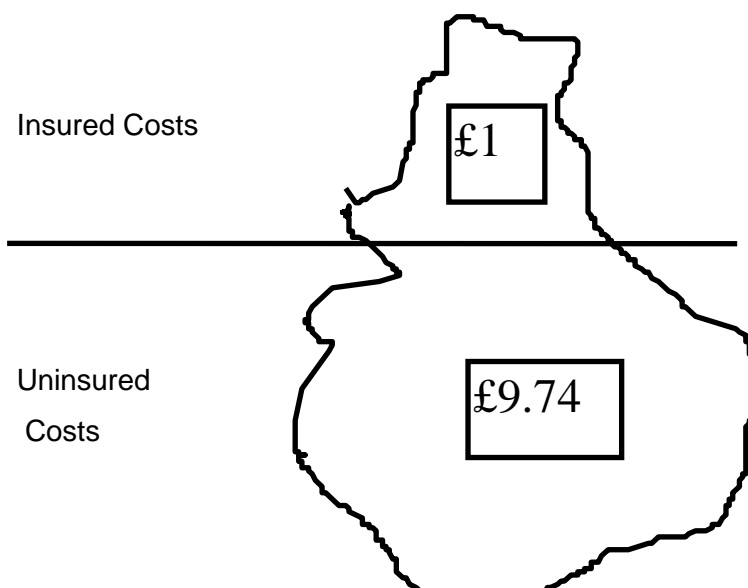
C. Insurable vs uninsurable costs

In our research we have identified that a proportion of direct costs are uninsurable, for example the costs of undertaking work to prevent the recurrence of accidents. Accident icebergs can be drawn showing that if insurable costs are above the line, and uninsurable below the line, an even greater part of the iceberg is 'hidden' than is the case for the traditional, direct vs indirect cost, accident iceberg.

Accident Iceberg for all accidents during study period, RoI



Accident Iceberg for all accidents during study period, NI



What the insured vs uninsured cost icebergs show clearly is that it is economically inefficient, even in the short term, to for the attitude to be adopted by owners and managers of firms, "It does not matter if there are accidents, that's why we have insurance. We'll make claims and that will cover our costs."

V PREVENTION OF ACCIDENTS

In response to an increasing awareness of the costs of accidents, both within firms and in the research literature, there is a growth in the attention being paid to prevention of accidents. In this section we will report on some of the interesting recent experience on prevention of accidents.

Our research, based on the Report Form (Appendix I), is a pointer to the first way of controlling costs of accidents in the workplace: investigating them. Kertesz (1994), reporting on the annual conference of the Risk and Insurance Management Society, summarised the argument of a number of risk managers, that even minor accidents should be investigated, and causes identified and eliminated. This prevents the occurrence of more serious accidents in the future.

Second, firms can institute safety programmes. There are many descriptions of safety programmes in such journals as *Occupational Hazards* and *HR Focus*. A key feature of successful programmes is that they are dynamic. This point is made by Perry (1994), for example, that "Posting safety signs is not enough; the effect wears off rapidly. In contrast, studies show that workplace accidents are reduced by any activity that reminds workers of safety needs." The emphasis is on 'activity', in the sense that provision of information through notices, leaflets or booklets is inadequate.

Two additional points can be made about safety programmes: 1) incentives can be effective; 2) participative schemes are best.

1) Incentives. According to a number of case studies, programmes involving incentives to prevent accidents can save more than they cost. Silverstein (1996), for example, reports on a boating company that had workers' compensation costs and claims of 75 per cent above the industry average. In discussions between management and workers on how to solve the problem, the workers suggested the idea of cash incentives. Management agreed to give "a cash award to every

employee who remains injury free for six months, and the company's claim and costs are [now] 15 per cent less than the industry average."⁷ Perry (1994) elaborates that such schemes "can be as simple as having a company-sponsored party every time the business achieves a certain number of days without an accident or as complex as point systems that award bonuses for a string of safe days."⁸

2) Participation. LaBar (1994) describes the reduction in Mobil Chemical's direct accident costs from \$18 million in 1982 to \$2 million in 1993 as a result of the "implementation of a strong safety and health process based on employee involvement". In Akzo's salt refinery in Akron, Ohio, a participative safety programme similarly reduced workers' compensation costs, from around \$500,000 per annum in the 1980s to \$150,000 per annum in the 1990s. In this case the safety programme, which included incentives, was just part of a cooperative management programme, including the adoption of TQM principles. In this kind of programme, the responsibility for safety is removed from the centre down to the worker and supervisory level at the shop floor. In another article, LaBar (1993) shows in more detail how the safety function can be incorporated into separate business units, or, at an even more disaggregated level, self-directed work teams. This happened in the early 1990s in major corporations like IBM and DuPont, but the argument is put that similar approaches can also be successful in small organisations.

In addition to the investigation of accidents and the introduction of safety programmes, Perry (1994) suggests a sharing of information about the costs of accidents with employees; an awareness of the fact that high costs of accidents can threaten the firm's survival - and hence employees' jobs - can encourage the cooperation of employees in the prevention of accidents. Perry also argues that a rapid response on the part of the company to accidents can reduce claims. Mitchell (1996), writing specifically about the catering industry in the UK, agrees. Staff in that industry respond well to high safety standards within the workplace. Not only does evidence of the concern of management for employees' safety improve the safety record of firms, it also improves workers' performance in other areas.

⁷ LaBarr (1994) describes a different type of financial incentive scheme in Canada, where the state (through the Workers' Compensation Board) offers financial rewards to firms with the most improved record over a two-year period.

VI CONCLUSION

The results of our research show, first, how costly accidents are and secondly they show how many smaller accidents which do not legally have to be reported are occurring in firms every day. The aim of future research has to be to assess the costs of accidents in smaller firms which do not tend to have accidents over a twelve week period; this has been shown in both studies where the smaller firms reported no accident during the study. To focus on this important sector in both the Northern Irish and RoI economies would involve a study over a longer period or a larger sample with a concentration of such small firms.

In relation to our summary of some of the recent writing on the prevention of accidents, the key issue seems to be that safety is just another functional area of firms that is being incorporated into new forms of work organisation. Performance incentives and team working are among the features of new forms of work organisation that are also mentioned frequently in the safety literature. It is likely that best practice firms in other respects are also those with the best safety records

⁸ Note that incentives can result in non-reporting of accidents rather than a reduction in accidents. This is obviated by high levels of intra-organisational transparency.

APPENDIX I:

REPORT FORM USED

NAME OF COMPANY: _____ DATE: _____

ACCIDENT REPORT

For this study the term accident is defined as any unplanned event that resulted in

- injury or ill-health of people or
- damage or loss to property, plant, materials or the environment, or
- a loss of business opportunity

A report form should be completed for any accident which results in more than 15 minutes in lost time or financial losses of more than £5.

1. Details of accident/absence

Accident

a) Date of Accident _____ Time _____ am/pm

b) Brief details _____

c) Did the accident have the potential for more serious consequences? Explain _____

d) Was it in the power of the organisation to prevent this accident? YES ___ NO ___

e) Was anybody injured? YES _____ NO _____

f) If yes please describe injuries _____

2. Time lost by employees and managers due to accident or absence

- Please include all persons who are involved (however remote)
- Use the Action Identifiers from below for each person involved in column b
- Insert the grade code for each person from question 8 in Initial Information form in column c
- Put the normal time spent by each person for each action in column d
- Put the overtime spent by each person for each action in column e
- Put any comments on each action in column f

a	b	c	d	e	f
Person	Action Identifier (see below)	Grade Code	Normal Time	Overtime	Comment

Action Identifiers

- A** Injured Person(IP)
- B** Unplanned Absence
- C** Absence due to previously reported accident or accident pre-dating survey
- D** Assisting, dealing with accident (giving first aid, comforting IP)
- E** Cleaning up after accident and dumping product if necessary
- F** Time spent re-arranging and training labour
- G** Replacement labour (eg. contract or temporary staff, moving existing staff, working overtime)
- H** Total cost of employing outside contractors
- I** Arranging repair or replacement of equipment/machinery
- J** Reworking/disposing of spoiled material
- K** Repairing equipment/plant
- L** Overtime worked due to rescheduling of production

- M** Management time spent investigating accident, speaking to safety reps, visiting IPs, processing insurance claims, dealing with affected customers etc.
- N** Any other time lost, please explain

3. Costs resulting from accident or absence

COSTS/LOSSES DUE TO ACCIDENT	COST IN £	ANY ADDITIONAL COMMENTS
1. Cost of taxi, doctor, ambulance		
2. Cost of replacement or repair of plant/machinery		
3. Cost of plant/equipment hired or purchased to carry out repair work		
4. If any routine work was undertaken at the same time please estimate the cost saving this involved		
5. Cost of material, spares etc. used for remedial work		
6. Extra costs incurred trying to complete the order		
7. Products and materials lost/wasted/not to specification		
8. Value of shortfall on orders		
9. Cost of disposal of materials or equipment dumped		
10. Any income gained from parts or materials traded in or sold		
11. Costs associated with improving system or procedure to ensure the accident doesn't recur		
12. Any additional costs (eg. penalty for shortfall of orders, fines etc.), please explain		

THANK YOU FOR YOUR TIME AND CO-OPERATION

INITIAL INFORMATION REQUIRED

1. Name of firm _____
2. No. employees _____
3. Year established _____
4. Does the company have a Safety Statement? YES _____ NO _____
5. Does the company have a safety officer? YES _____ NO _____
6. What insurance premiums does the company pay annually? _____
7. What cover does this provide for the company? _____

8. Please complete

Occupation category	No. people in category	Salary scale	Overtime rate, if applicable	Grade code for questionnaire
Professional, Skilled worker - management				
Professional, skilled worker - non-management				
Semi-skilled or unskilled worker - management				
Semi-skilled or unskilled worker - non-management				

THANK YOU FOR YOUR TIME AND CO-OPERATION

NOTES FOR GUIDANCE ON COMPLETION OF FORMS

Initial Information Report Form

The Initial Information report form should be completed before the study begins. It provides us with basic information about your firm and gives grade codes for each category of employee, thus making completion of the Accident/Absenteeism report form more efficient.

Question 8 - Some examples of employees in each category:

Professional, skilled workers:

Employer, Managing Director
Accountant
Engineer
Salesman
Carpenter
Bricklayer
Electrician

Semi-skilled and unskilled workers:

Assembler
Builders Scaffolder
Machine Operator
Lorry driver (short distance)
Packer
Storeman
Labourer

Accident Report Form

The Accident report form should be completed for every accident.

By **accident** we mean

'any unplanned event or process that results in injury or ill health of people, or damage or loss to property, plant, material or the environment or a loss of business opportunity'.

Thus even any accident that doesn't result in personal injury must be included. Only accidents which result in losses of more than £5 or 15 minutes in lost time need be reported.

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