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Theoretical and Practical Research on the Consequences of Work-related Accidents registered in the Romanian Ministry of Internal Affairs

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Abstract

In police institutions, the most frequently reported risk factors are linked to painful work positions, like sitting at the office for a long time, or other risks such as working with difficult or dangerous citizens, the risk of injury caused by motor vehicle driving during work, poor communication or cooperation within the organization, the lack of influence of employees on the pace of work or their working conditions, the pressure of time and the insecurity of the workplace. All these risk factors, related to how work is organized and managed, sometimes cause serious workplace injuries and illnesses that can damage the mental and physical health of the policeman and result in both tangible and intangible costs for them and for the organization in which they work. The main reason for this study is the general lack of knowledge that police organizations have regarding the actual cost of occupational injuries. Because there is little available literature on the topic of police occupational injury costs, this micro study aims to scan the research available on macro studies regarding accidents costs and furthermore to analyze the frequency and severity of work-related accidents in Romanian police organizations by comparison with existing data on work-related injuries for all occupations at national level.

The severity and frequency variables presented in this study can be helpful in the future to calculate the total cost of work accidents in spite of the fact that statistical institutions and police organizations in Romania do not keep full records regarding injury costs.

Keywords: Work Accidents, Occupational Health and Safety, Safety Management, Policing, Work-Related Injuries, Work-Related Costs

Introduction

Jobs are constantly under the influence of economic and social changing conditions and increasingly complex processes and changes in terms of working conditions, along with other types of new or emerging risks, require a new and systematic approach to health and safety at work. In the context of societal change, at European level, the findings reflect the continued growth of the services sector, the most frequently reported work risk factors in all productive

sectors being the psychosocial risks that may result from working with citizens, as well as physical risk factors which derives from repetitive movements and uncomfortable positions at work, basically confirming that musculoskeletal disorders are common to all work activities.

Police work incur major risks for the staff performing it. Besides the well-known risks arising from the activities that police carry out in the vicinity of criminal entities, policemen often become victims of other work-related accidents, such as road accidents, falls, sliding during pursuits or rescue actions, injuries during sports training activities, during missions or during training with firearms.

Also, working many hours in the sun, rain, polluted air, noise, radiation, the handling of toxic substances or drugs, the use of chemicals in the laboratory analyzes as well as physical contact with people suffering from contagious diseases are illness risk factors for police officers.

Also, ergonomic risks do not overlook police officers. Long periods spent in a stationary position in cars or at the office, heavy equipment worn during missions, walking on distances for a long time, intense physical effort and work in awkward positions cause musculoskeletal disorders, which currently represent the most common form of occupational disease in this profession.

Despite numerous health and safety regulations, there are still many important issues in terms of ensuring optimal working conditions, materialized in a large number of occupational accidents and occupational injuries at national level.

While in private organizations, managers believe that investing in the prevention of accidents and occupational illnesses leads to a reduction of profit, in public organizations, including police institutions, the feeling is that the protection of workers' health and the effort to reduce the number of work accidents ultimately reduces costs and brings benefits to the organization.

In Romania's public institutions, which do not exclude police organizations, clarifying the economic impact of occupational accidents and occupational illnesses remains at theoretical level, but there are reasons to believe that there are intentions to use economic reasoning in the calculation of work accidents costs, not just to prevent them, but especially to justify the investments made to protect the health and safety of the workers. This study undelines that police organizations do not track direct and indirect costs of occupational injuries because work-related accidents costs are difficult to measure due to the fact that they are not the same for all employees or they may not be in the same categories, and because of this police units do not allocate enough resources to reducing them and also being unaware of the magnitude of these costs, there is a minor interest in measuring them. Another reason for the lack of data regarding accidents costs is that in police organizations there is a strong attitude of indifference towards occupational injuries because policemen tend to accept the fact that work-related accidents happen all the time and injuries are a part of the job.

Literature Review

Although many countries realise the importance of occupational safety and health, many workers still face unhealthy and unsafe working conditions (ILO, 2012). In 2013, there were approximately 3.1 million non-fatal accidents with at least four days of absence and almost 3.7 thousand fatal accidents in the European Union (Eurostat, 2016a). In the same year, the

percentage of the EU population suffering from one or more work-related health problems, caused or made worse by work, was on average 7.4% (Agilis, 2015).

A thorough search of the scientific literature reveals very few studies that attempted to determine the cost of occupational accidents in police organizations, almost all scientific research on this matter has been conducted decades ago and refer to private organizations in general.

To estimate the costs of the work-related accidents is a difficult task, because it will be necessary to estimate the number of cases of work-related ill-health and subsequently apply monetary values to the identified cases.

The issue of the economic calculation of occupational accidents and the impact that occupational safety and health investments have on workers' safety has been widely debated by labor specialists (Dorman, 2000). Thus, the perspective of occupational safety and health must take into account both causes and consequences. The central axis of economic theories in health and safety at work is that of costs. We have costs that are made to improve our jobs, to make them safer and healthier and we also have the costs we pay when we do not make these improvements.

Costs can be economic and non-economic. In the case of work accidents, non-economic costs can refer to pain, fear of loss suffered by human beings, mainly by the victims of accidents, their families and even by the society in general. Work accidents generate costs that are often ignored by managers. The manager associates these costs with the fees paid to insurance companies and other medical expenses, but these are just direct costs. There are other losses that are called indirect costs or which are found in the literature under other names such as uninsured (Simonds, 1956), individual (Compes, 1965), unknown (Amphous, 1972), hidden (Levitt et al., 1981), variables (Andreioni, 1985) or uncontrollable costs (Laufer, 1987). All authors have attempted to determine empirically indirect costs only because of the difficulty of isolating them, the impossibility of quantifying them or their marginal dimension. They used samples to which they applied similar questionnaires based on which six categories of costs were distinguished, namely wage costs, material losses, administrative losses, production losses, trade, and other costs like transportation costs, hospitalization, court fees, etc.

Accidents involve indirect or invisible costs that are not inventoried by the manager but which can have considerable economic consequences (Heinrich, 1959): the time paid but not worked by the victim on the day of the accident, the time paid but not worked by the other employees who stopped the activity, supervisors of the victim, time lost by a doctor or nurse, material damage, production disruption, delivery delay, paid social benefits, loss of earnings as a result of the worker's reintegration, the whole salary paid to the victim staying at home, loss of organization's prestige. The researcher has set a 4 to 1 ratio demonstrating the importance of an indirect cost and a direct one. Considering that the established ration is not accompanied by any statistical analysis, it can not be verifiable.

Other authors (Calabresi, 1970; Steele, 1974; Chelius, 1982) analyzed the cost-benefit ratio for occupational accidents and occupational disease prevention. For this they have attempted to equalize the cost of the repair, directly and indirectly, with that of preventing the last accident.

As for the construction industry, one study (Levitt et al., 1981) shows that 3% of project costs are accounted for by total accident costs and 10% of wage costs.

Other research was carried out by comparing the costs for the employer with the total costs including public administration losses, such as hospital costs and medical costs for the victim, resulting in a total cost ratio of 4/5 (Klen, 1989). Mangan (1993) estimated a 6/1 ratio between direct and indirect costs of occupational accidents and occupational diseases in Australia.

Unlike Heinrich's findings, other authors talk about insured costs that are associated with direct costs and uninsured costs that are actually indirect costs (Grimaldi, 1956). The author considers that the employer's insurance is 30% higher than the compensation, as it also includes the administrative expenses, the profit of the insurance companies, the funds for the prevention and the special ones administered by the insurer, which should be taken into account in the calculation of indirect costs. By comparison, the list of uninsured costs is almost identical to that of Heinrich, from which elements that are considered valid, not quantifiable or marginal have been removed. Thus, in order to determine the total costs, the number of accidents of each type should be multiplied, namely accidents with temporary work incapacity, permanent work incapacity, requiring medical care inside or outside the organization, with the average costs proposed by the author.

After the 70's, Grimaldi and Simonds have resumed their studies using similar methodologies to see if the scores are kept after 20 years (Imre, 1976). Research has shown that the results are maintained, respectively that the same cost elements holds the largest share of the total cost. Laufer (1987) assesses the magnitude of the cost of accidents by using a definition of direct and indirect costs, retaining as uninsured costs the time wastage, complementary salaries, and costs of property losses.

Other Scandinavian authors (Aaltonen and Soderqvist, 1987) attempted to determine the indirect costs of work-related accidents, but did not take into account indirect costs, because time losses caused by an accident were not reflected in a reduction in production and sales, as in most cases firms secure their production by bringing a surplus of workers for labor.

In the same year a survey was conducted on the cost of work-related accidents across the UK's construction industry (Leopold and Leonard, 1987). British researchers included material losses in direct costs, and fixed costs with insurance were not considered as direct costs, being treated as externalities and examined separately.

Regardless of the results of the research, they could not be compared because of the differences in the definition of costs and types of costs.

Unlike the civilian population police officers are frequently injured on the daily job. Policemen have extremely important jobs when they put their lives on the line every single day to keep us safe, catch criminals and prevent wrong doing.

Due to the inherent dangers of their profession, police officers are at constant risk for serious illnesses, severe injuries and death.

Police officers are confronted with many risks on the job, including physical assault, car accidents and exposure to dangerous toxins and chemicals. Police officers are often hesitant to report their injuries out of loyalty to their agencies or because they accept that certain injuries are simply part of the job. They often make this mistake. If they are being injured in the line of duty, they don't report it to their supervisor immediately. Then, also they don't get in touch with an experienced attorney who can preserve their rights under workers' compensation law and their health, career and also their future may depend on it.

Policing involves repeated and long-term exposure to high job strain or violence, all of which have a negative impact on the policemen's physical and mental health and this is particularly true for police officers and firefighters who also deal with physical, chemical, biological and psychological hazards while on duty (Melius, 2000; Bolstad-Johnson et al., 2000; Violanti et al., 2006; Guidotti, 2016).

Policing and firefighting are generally regarded as high-risk and high-stress occupations by a large number of studies, because workers belonging to those two categories of staff spend significant time working outside and managing unpredictable situations resulting from a high-stress work environment (Laursen et al., 2000).

Due to the harsh nature of law enforcement, police officers are at a high risk of work-related physical injury (Brown and Bonneau, 1995). Law enforcement duties may include running, restraining non-compliant offenders, carrying injured or unconscious people, using self-defence techniques, and manual handling tasks (Pryor et al., 2012). Actions for controlling an offender who is resisting arrest, trips, falls, can all contribute to the high risk of injury within the law enforcement occupation. As a result of all these dangerous factors, law enforcement officers are at a greater risk of musculoskeletal injuries, than other employees in many other work activities (Achterstraat, 2008).

Just like any other employee who suffers a job-related accident, police officers are eligible to collect workers' compensation benefits to help cover lost wages as well as medical bills for any temporary or permanent disability. Also, this injury risks have an impact not only on the worker, but also on the police organization, which has to bear both the financial and workforce burdens of days lost due to injury and the post-injury rehabilitation or workers' compensation costs (Boyce et al., 1992; Violanti et al., 2013; Brandt-Rauff et al., 2016). These costs vary greatly within the literature, depending on the severity of injury, the length of time off work and the country in which the study was completed.

Although some authors do not actually calculate the total cost of accidents some studies have speculated that changes to post-injury rehabilitation may be needed in an attempt to reduce the duration of time that law enforcement officers are off-work and the associated financial burden (Aisbett et al., 2016). Other authors sustain without indicating figures that occupational injuries affect the physical, social and psychosocial wellbeing of police officers, which has various public health costs implications (Violanti et al., 2013). The direct costs often relate to disruption of services from increased sick leave or reduced productivity (Van Ooteghem, 2006). Also the cost implications of a poor health and safety management for police officers are often associated with reduced salaries or unpredicted healthcare expenses and employers incur direct costs mainly from insurance premiums and legal settlements (Antao et al., 2016). The increase in medical expenses and loss of earnings, leads eventually to loss of goods necessary for livelihoods (ILO, 2012). Regarding indirect costs some authors sustain that the families of the affected police officers also suffer financially and emotionally (Leigh et al., 2006).

Another consequence of work-related ill-health is presenteeism and studies have shown that productivity losses stemming from presenteeism may be even higher than from sickness absence (Goetzel et al., 2004), in contrast to sickness absenteeism, which can be defined as not going to work because of health issues. Since presenteeism is connected with productivity and output losses with future ill-health, it is also beneficial to include presenteeism in the construction of a costing model.

Days of absence are important in cost calculation too. The calculation of direct costs is relatively straightforward. However, calculation of indirect costs and, more specifically, productivity losses is complex. The two most common ways to do it are the human capital approach and the friction cost method. Indirect costs using the human capital approach are estimated by multiplying the measured number of work days missed by the estimated or measured average daily income of an employee. In the human capital approach it is assumed that wages are a proxy measure of worker output. The friction cost method, in contrast, is based on the assumption that the production costs or losses are related to the time needed to replace a sick worker for the organisation to reach the initial production level. Therefore, based on the friction cost method, indirect costs will consist of the value of production losses and/or extra costs to maintain production, and/or, if permanent replacement is necessary, the costs of recruitment and training (OSHA, 2014)

Database and Methodology of Research

This paper would like to identify two variables that might be used in calculating the total cost of accidents and injuries at workplace, respectively the frequency and the severity of work related accidents. We collected data regarding police work accidents for analysis for a period of 4 years, from 2014 to 2017. Data for 2018 could not be taken into account for the analysis as they are not yet available for police organizations.

Taking into account the provisions of the Romanian law governing labor were considered as '*work-related accidents*' those occurred during sports activities, accidents occurring when leaving for home or for work or during breaktime.

The term '*work-related accident*' is defined as '*the violent injury as well as the acute professional intoxication occurred during work or the discharge of the service duties caused by temporary work incapacity for at least three days, total invalidity or death*'.

For the accuracy of the data analyzed, only work accidents completed in that year were taken into account for each year.

Since there are no other indicators to support a correct calculation of work related accidents costs', because in police institutions there is no inventory of specific indicators regarding direct and indirect costs, labor accidents have been analyzed only in terms of frequency indices, representing the number of injured persons per one thousand employees, and severity indices, representing the number of days of temporary work incapacity per one thousand employees.

Data was arranged and organized in a personal database in order to be easily compared with the existing annual data on work-related injuries for all occupations at national level.

Results and Discussion

The analysis revealed that in 2014 the total number of those injured at the level of the Romanian Ministry of Internal Affairs was 286 workers, most of them military/police staff (266 employees). Most of these were men (255). All of them were registered as temporary work incapacity, and the peak of the injuries was between the ages of 35 and 39.

The Work Frequency Accident Rate Index for the year 2014 was 2.09/1,000, compared to 1.75/1,000 in 2013 and double in comparison with the national calculated index of 0.88/1,000.

The frequency index also revealed the risks of injury to police and emergency personnel. For police officers it was 2.5/1,000 and for firefighters a little over 2/1,000.

Distribution by type of accidents was maintained as in 2013, as 23% of accidents were recorded as a result of an aggression, 19% as a result of car accidents and 15% as a result of physical training.

Regarding to the Severity Index for 2014, the impact of negative consequences on the employer was 110 days/1,000 compared to 73 days/1,000 in 2013 and 74 days/1,000 at national level. Practically these significant differences confirm the particularly risky nature of the police activities that the staff of the Ministry of Internal Affairs performs, both in terms of frequency and gravity.

High gravity indexes have the policemen, firefighters and gendarmes. Most accidents occurred with police officers (51%), firefighters (21%) and gendarmes (15%).

Of the total number of injured police officers, 39% of the accidents occurred as a result of physical aggression, 27% as a result of car accidents and 18% in other circumstances of work process, namely slipping, dropping during missions, accidental shooting. At the level of firefighters, accidents did not occur as a result of physical aggression, but during physical training, in 28% of cases and 62% in other circumstances of the work process like fire extinguishing and rescue actions.

In 11% of the cases, gendarmes were injured as a result of physical aggression, 20% during training, and 41% in other work-related circumstances, when ammunition was destroyed or there have been injuries caused by accidental falling during missions.

In 2015, the total number of those injured in the Ministry of Internal Affairs was 223, with a decrease of 22% from the previous year, of which most injured were military/police personnel (204 employees). Most of these were men (203). 220 of them were registered as temporary work incapacity and completed by resuming work and 3 work-related accidents were completed by the death of the victims. The peak of the injuries was between the ages of 35 and 39.

The Work Frequency Accident Rate Index for the year 2015 was 1.6/1,000, compared to 2.09/1,000 in 2014 and double in comparison with the national calculated index of 0.88/1,000.

The Frequency Index also revealed the risks of injury to which border guards, policemen and firefighters are subjected. For police officers this was lower than in previous years, 1.5/1,000, for firefighters 2.5/1,000 and border guards a little over 2.2/1,000.

Distribution by type of accidents reveals that 18% of accidents were recorded as a result of aggression, 17% as a result of car accidents and 14% of physical training.

Regarding the Severity Index for 2015, the impact of negative consequences on the employer was 74 days/1,000 compared to 110 days/1,000 in the previous year and 61,9 days/1,000 at national level.

In the top of the first categories of staff with a high gravity index are policemen, firefighters and border guards. Most accidents occurred with policemen (41%), firefighters (29%) and border guards (13%).

Out of the total number of injured police officers, 38% of the accidents occurred as a result of physical aggression, 25% due to car accidents and 23% in other work process circumstances, respectively wrong moves, slippage, drops during missions, accidental shootings, drops of objects over the victim.

At the level of firefighters, accidents did not occur as a result of physical aggression, but during physical training, in 26% of the cases and 62% in other circumstances of the work process in other circumstances of the work process like fire extinguishing and rescue actions.

Only 3% of the accidents involving border guards were due to physical aggression, 10% due to car accidents, with most accidents occurring as a result of specific work activities (57%) and trauma accidents 27%) when leaving the workplace or coming to work.

In 2016, the total number of injured decreased to 180 people, compared to 223 injured in 2015, most of the wounded were military/police staff, namely 168 employees. Most of those injured were men (171). Almost all accidents completed in 2016 were framed with temporary work incapacity (178) and were completed by resuming the activity and two work accidents were completed by the death of the victim. The peak of injuries was between the ages of 35 and 39 and between the ages of 40 and 44.

The Work Frequency Accident Rate Index calculated for 2016 was 1.39/1,000, compared to 1.6/1,000 in 2015 and higher than the national calculated at 0.99/1,000.

The Frequency Index revealed higher injury risks to border guards in 2016. For border guards it was over 2/1,000, compared to over 2/1,000 for firefighters, 1.5/1,000 for police officers and 1.5/1,000 for gendarmes.

Distribution by type of accidents reveals that 13% of accidents were recorded as a result of aggression, 22% as a result of road accidents and 11% of physical training.

With regard to the Severity Index for 2016, the impact of negative consequences on the employer was 48 days/1,000 compared to 74 days/1,000 in the previous year and 34,8 days/1,000 at national level.

In the top with the highest gravity index were the border police. Most accidents occurred with police officers (47%), firefighters (17%) and gendarmes (19%).

Of the total number of injured police officers, 19% of the accidents occurred as a result of physical aggression, 41% as a result of car accidents and 28% as a result of other work-related circumstances, respectively wrong moves, slides, drops during missions, accidental shooting, explosions. Concerning firefighters, accidents did not occur as a result of physical aggression, but during physical training, in 19.4% of the cases and 74.2% in other circumstances of the work process circumstances like fire extinguishing and rescue missions.

At the level of border guards, 10.3% of the accidents were due to physical aggressions, 6.9% due to car accidents, most accidents occurring as a result of specific work activities (48.3%) and road accidents (24.2%) when leaving or coming to work.

The total number of work injured in the year 2017 was 239 employees, up to 32.7% in comparison with the previous year, of which the most injured were military/police personnel (232). Most of the injured were men (226). 233 accidents completed in 2017 were for temporary work incapacity and 6 work accidents ended with the death of the victim. The peak of injuries was between the ages of 40 and 44.

The Work Frequency Accident Rate Index calculated for 2017 was 1.87/1,000, compared to 1.39/1,000 in 2016 and higher than the nationally calculated for 0.68/1,000.

The Frequency Index revealed higher injury risks for police personnel and firefighters in 2017. For police and firefighters this was between 2/1,000 and 2,5/1,000. Distribution by type of accidents reveals that 17% of the accidents were recorded as a result of aggression, 27% as a result of car accidents and 13% as a result of physical training.

Regarding the Severity Index, the impact of negative consequences on the employer was 62 days/1,000 compared to 48 days/1,000 in the previous year and 30,3 days/1,000 at national level.

The highest gravity index is held by police officers. Most accidents occurred with policemen (47%), gendarmes (24%) and firefighters (21%).

Of the total injured police officers, 32% of the accidents occurred as a result of physical aggression, 35% as a result of car accidents and 29% in other work process circumstances, namely misdirected movements, slipping or dropping during missions. At the level of firefighters, accidents did not occur as a result of physical aggression, but during physical training, in 39% of cases and 57% in other circumstances of the work process when extinguishing fires or saving people.

For the gendarmes, only 4% of the accidents were due to physical aggression, 33% due to car accidents, with most accidents occurring as a result of specific work activities (47%) and physical training (11%).

The most important findings are resumed in the following tables:

Table 1: Variables for cost analysis of work-related injuries

Variables	Year 2014	Year 2015	Year 2016	Year 2017
<i>Total employees injured</i>	286	223	180	239
<i>Rank personnel injured</i>	266	204	168	232
<i>Temporary work incapacity cases</i>	286	220	178	233
<i>Total work incapacity cases (caused by death)</i>	0	3	2	6
<i>Work Frequency Index Rate</i>	2.09/1,000	1.6/1,000	1.39/1,000	1.87/1,000
<i>National Frequency Index Rate</i>	0.88/1,000	0.88/1,000	0.99/1,000	0.68/1,000
<i>Frequency Index Rate for police officers</i>	2.5/1,000	1.5/1,000	1.5/1,000	2-2.5/1,000
<i>Frequency Index Rate for firefighters</i>	2/1,000	2.5/1,000	over 2/1,000	2-2.5/1,000
<i>Severity Index in police organizations</i>	110 days/1,000	74 days/1,000	48 days/1,000	62 days/1,000
<i>Severity Index at national level</i>	74 days/1,000	61.9 days/1,000	34.8 days/1,000	30.3 days/1,000

Table 2: Rate of occurrence of work-related injuries

Variables	Year 2014	Year 2015	Year 2016	Year 2017
<i>Aggressions (for policemen%)</i>	23% (39%)	18% (38%)	13% (19%)	17% (32%)
<i>Car accidents (for policemen%)</i>	19% (27%)	17% (25%)	22% (41%)	27% (35%)
<i>Accidents occurred during training, missions or other work process circumstances (for policemen%)</i>	15% (18%)	14% (23%)	11% (28%)	13% (29%)

Conclusions

The results are showing that the total number of injured persons remained at a high level, most of the injured were military or police rank personnel and not civilian employees. In most situations, accidents have resulted in temporary work incapacity and ended with the resumption

of work, in comparison with a relatively small number of accidents that have resulted in the death of the victim.

Frequency and severity indices have been often almost doubled in comparison with those registered at national level, which shows the high degree of risk to which the staff is exposed to the rest of the civilian population in other areas of activity.

Most accidents occurred due to work-specific activities, but in the case of policemen and gendarmes ensuring public safety, a high percentage of accidents was due to physical aggression against them.

The aim of this study was to provide further research on the calculation of work-related accidents costs and the results show that work accidents are indeed a major problem for the Romanian law enforcement agencies.

The study aims to identify useful variables for the calculation of the costs of accidents at work, work-related health issues and work-related deaths in police institutions only the work-related accidents cost assessment was limited by the unavailability of the national data sources. There is insufficient data to determine costs relating to accidents at work and work-related health problems because data from national registries of occupational injuries suffer from the same shortcomings as the international data. Not only the incomparability of data is a problem, but also under-reporting seems to be also a big problem. For the time being, available national data sources are not sufficient to estimate the cost of work-related accidents.

An approach with the variables presented in this study may allow partial cost estimation. However, an estimate of the total burden of work-related accidents would require a large number of assumptions to be made.

In addition to the specific indicators calculated in the present study, which may possibly only be taken as variables for the calculation of direct work accidents costs, there are also other variables that can be identified as costs in the event of an injury at work. This last statement can be taken into account as public institutions do not bear themselves the cost of labor accidents because those kind of incidents generate costs for other institutions as well, for workers themselves, for their families and even for the whole society.

Finding a fair calculation formula for determining the cost of work-related accidents is a heavy burden for all parties involved and requires a common effort from all those who suffer from these incidents: workers, citizens, families of injured, insurance companies, the organization, health and safety services at work and also those who protect the state's budget.

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