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POSSIBILITIES OF CREATING AN ACCIDENTOLOGY DATABASE

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Abstract: *The BDA software (accidentology database), collection and interpretation of accident data was performed in order to ensure quick and efficient processing as them, quickly identifying the major risk areas to be intervened immediately, in order to provide the optimal solutions in a short time for road safety. The intention is therefore, to some extent, be brought to a contribution to reducing the number of road accidents or at least to reduce the cases of people killed or injured due to road accidents. The exploiting of BDA software allows an objectively and operational interpretation of data in real time on accident (graphical and tabular interpretation). BDA program, designed especially for Web can be accessed only by registered users. BDA implementation involves some costs, but they are very small compared to the economy that would result from reducing the road accidents.*
Key words: *accidentology, database, web, road safety.*

1. INTRODUCTION

Road traffic accidents are a major threat on human life road users, accounting for individuals and society is a major risk and extremely expensive [1, 2, 3, 6, 7].

Accidentology studying the stages, referring to all aspects since climbing involved driving (car boot) to the actual production of the accident. It highlights the risk factors, the frequency of their manifestation in well specified situations, their quantitative and qualitative influence on accidents, their independence and causal connections with different traffic characteristics, etc. Accidentology is based on the statistical study of road traffic accidents and various causes and conditions that have helped to produce them. Research activity and implementation of accidentology results is complex, because it requires interdisciplinary staff composed of: specialists that acquiring and processing the statistical information on accident; engineers that develop technical solutions to reduce the number and severity of accidents; doctors, psychologists and sociologists who certifies the best solutions; economists who determine implementation costs; policy makers [3, 7].

To avoid road traffic accidents, the existence of accidentology database could support the institutions directly involved in the development of road safety measures.

At national level, from the perspective of the database traffic and road traffic accidents were developed and implemented PHARE project RO 0107.11.03 "Traffic and Accidents Database" (TRADB), which was completed in late 2004 [9]. The implementation of TRADB was involved institutions and structures of national importance with responsibility for road safety [9].

The present paper aims to contribute to the possibility of creating and managing such databases, to be a support in making decisions regarding the improvement of road safety.

2. THE PURPOSE AND OBJECTIVES OF THE ACCIDENTOLOGY DATABASE

By using BDA, aims to highlight the risk factors, the frequency of their manifestation in in well specified situations, their quantitative and qualitative influence on accidents, their

independence and causal connections with different road traffic characteristics, etc.

In general, by exploiting BDA, is aiming to open new possibilities in the analysis of data of accidentology or the improvement of road safety. Is also the possibility to increase road safety shall be extended by BDA access of some users in interdisciplinary teams directly involved in accidentology subject.

The BDA development takes into account the driver behavior analysis respectively a study of road previous steps of the accident the with respect to all aspects involved from the driver is starting the car to the the proper produce of the accident.

3. REQUIREMENTS IN RESPECT TO THE IMPLEMENTATION AND OPERATION OF THE ACCIDENTOLOGY DATABASE

Functional requirements of the accidentology database are: BDA software interoperates with all popular operating systems (Windows 98, ME, XP, XP Professional x64, Windows 7, Windows 8, Linux). The minimum requirements for running the software are:

- Microsoft Windows 98;
- resolution of 1024 × 768 pixels and 256 colors;
- an Intel or AMD at a frequency of 800 MHz;
- 256 MB RAM;
- Internet Explorer, Firefox, and any web browser;
- internet connection.

Requirements relating to the information provided by the accidentology database. Of the factors whose interaction is decisive for traffic safety, BDA considered for development, is referred:

- technical factors related to the vehicle (vehicle category, constructive elements, particularly the mechanisms and subassemblies that directly depend on traffic safety: the steering, braking, rolling, lighting and signaling, active and passive safety measures, technical condition, etc.);
- related factors of driving road (state of the road infrastructure; profile, route and road characteristics, planning and adaptation of roads traffic conditions, the system of signals, signs, road signs, etc.);
- human factors (driver, passenger, pedestrian, sex, age, state of psycho-physical, personality traits, knowledge and skills, vigilance, anticipation, judgment, skills, etc.).

4. SOFTWARE DESCRIPTION AND THE MODE OF OPERATION

BDA software was developed in the PHP programming language. This is a software designed specifically for the web, so for a HTML page (Hyper Text Markup Language = language used to create web pages) can embed PHP code that will be executed on each page visit. PHP code [4, 5, 8, 10, 11] is interpreted by the web server and generate HTML code that will be seen by the user.

BDA software was designed to create a database in order to monitor the victims of traffic accident, the risk factors, the mechanisms of production and vulnerable population groups.

The software can be accessed from any computer that meets the requirements mentioned above by accessing a particular Internet address (eg *www.baza-data-accidente.ro*). Access to the software is through authentication with a username and password, which is assigned by the system engineer. If they are inserted the wrong software will display invalid user / pass (see Fig. 1). For each user it can be set that can perform operations (view, edit, add, delete).

After authentication it enters into the software interface which is simple and accessible, as shown in Figure 2. The software displays one menu of buttons: *accident statistics, adds, and a summary* of the latest introduced accident. If you want details about a particular accident is pressed *detail* (see Fig. 3) to his entitlement and the software will open a new page that will retrieve the required details.

To add an accident into the database it's pressed *add* button in which case it opens a new page in which can be filled by the following

fields (only the number of minutes is required, without this the accident is not added into the database):

– The identification data of the accident, namely, the number of minutes and data (see Fig. 4). The software also assigns an ID to each introduced accident;
– The data regarding the number of victims, the degree of injury of their respectively the material damage (see Fig. 5);

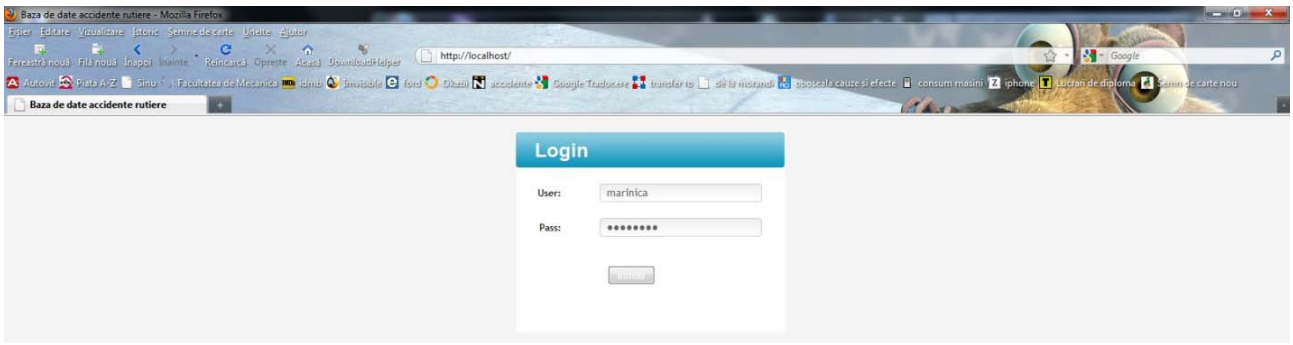


Fig. 1. Authentication home page.

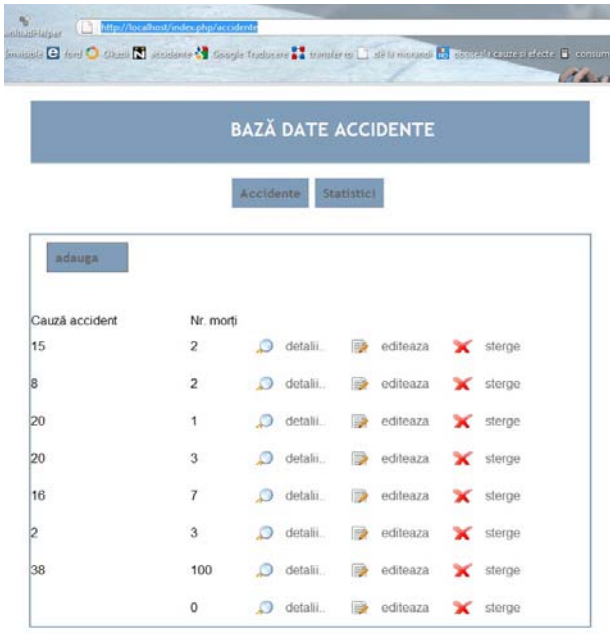


Fig. 2. The structure of the software.

Fig. 3. Details about the accident.

Fig. 4. Identification data of the accident.

Fig. 5. Situation of victims.

– The cause of the accident and its production mechanism (Table 1, Fig. 6). The cause of the accident is represented by a code, each case being allocated a code as in Table 1;
– The data about the place of the accident (see Fig. 7);
– additional data regarding the visibility on accidents, weather conditions, additional data related to the weather conditions, the author of the accident (see Fig. 8);
– data about people involved in the accident in regards the category their involvement, age,

profession and the influence of alcohol, etc. (see Fig. 9); vehicle data about: its category, brand, year, its technical state and environmental data about the founding organ from which it comes (see Fig. 10);

– other data (see Fig. 11) which can be very useful in the case on accidentology research and development of improved road safety measures (if the driver was wearing a seatbelt or helmet and that the accident occurred day or by night);

– after completion all fields that have informations it is press "send" button (see Fig. 11) to ensure that the data to be stored in the database and after pressing the "send" button, the program will display accident added (see Fig. 12) to confirm adding the accident in the database.

Table 1

Codes attributed to the causes of accidents occurrence for the BDA database

Code	Cause	Code	Cause
1	irregular overtaking	15	other pedestrian deviations
2	no grantig priority for vehicles	16	asleep at the wheel
3	no grantig priority for pedestrians	17	cyclists deviations
4	noninsurance reversing	18	deviations of drivers for carts and animal
5	noninsurance changing lane	19	technical problems of the vehicle
6	noncompliance distance between vehicles	20	failure to ensure the change of driving direction
7	pedestrians on road surface	21	noninsurance for the load stability
8	unattended children (0-6 years)	22	violation of the rule for railway crossing
9	driving on the oncoming traffic	23	cell phone use
10	irregular pedestrians crossing	24	deviations of machinery drivers
11	too fast sped for the to road conditions	25	driving without a license
12	drunk driving	26	children imprudence (7-14 years)
13	imprudent driving	27	infringement of traffic lights signaling
14	further deviations committed by drivers	28	unmarked obstacles on the roadway

Fig. 6. The cause and mechanism of the accident.

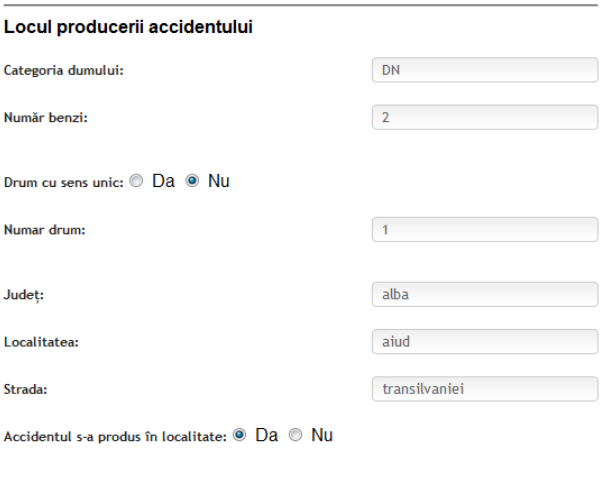


Fig. 7. The place of the accident.

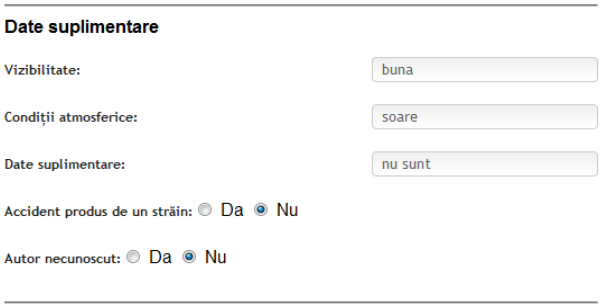


Fig. 8. Additional data.

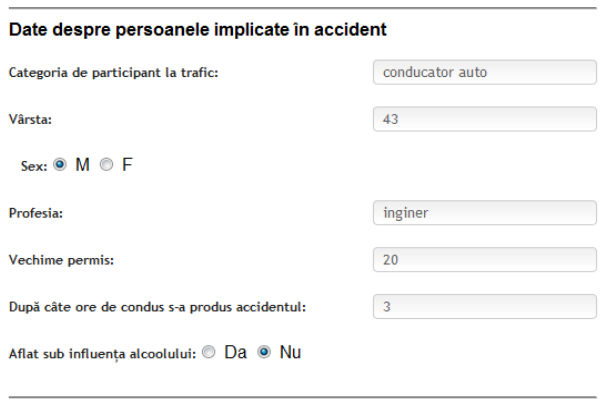


Fig. 9. Data about the people involved in the accident.

Fig. 10. Data about the vehicle.

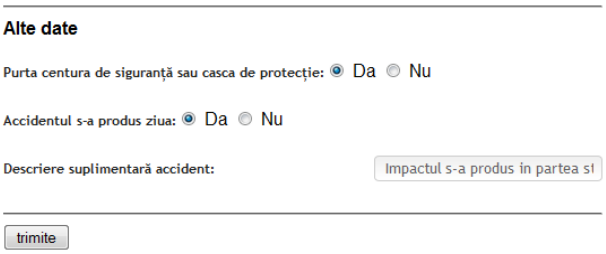


Fig. 11. Accident description.

Fig. 12. Confirmatory message for the addition of the accident.

If it's desired to edit an accident because it appear further information on this or some data was entered incorrectly, press the *Edit* button from the main menu (see Fig. 2).

To delete an accident that was introduced accidentally into the database it must pressed *delete* button from the main menu (see Fig. 2).

After pressing this button the software will display *accident deleted* (see Fig. 13) to confirm the deletion of accident.

Majority of the fields that have to be filled autofill have the option (see Fig. 14), with which the work speed increases exponentially.

Fig. 13. Confirmation message for deleted accident.

Fig. 14. Autofill option.

For the data interpretation from the database it's pressed *Statistics* (see Fig. 2). The software can provide a variety of methods of data interpreting from the database based on the user requirements. Thus, one can use:

– graphical interpretations regarding the situation of victims (dead, seriously injured and slightly injured) for a given calendar year or for a given calendar year compared to one another;
– data interpretation in table form;
– exporting the data (see Fig. 15) entered into the Excel data file (see Fig. 16) out where you can realize further an interpretation of them (Operation Data Export to Excel is done by the system engineer).

Besides such interpretations, the software can be improved depending to user requirements in order to offer a much wider aria of interpretation of accidentology data.

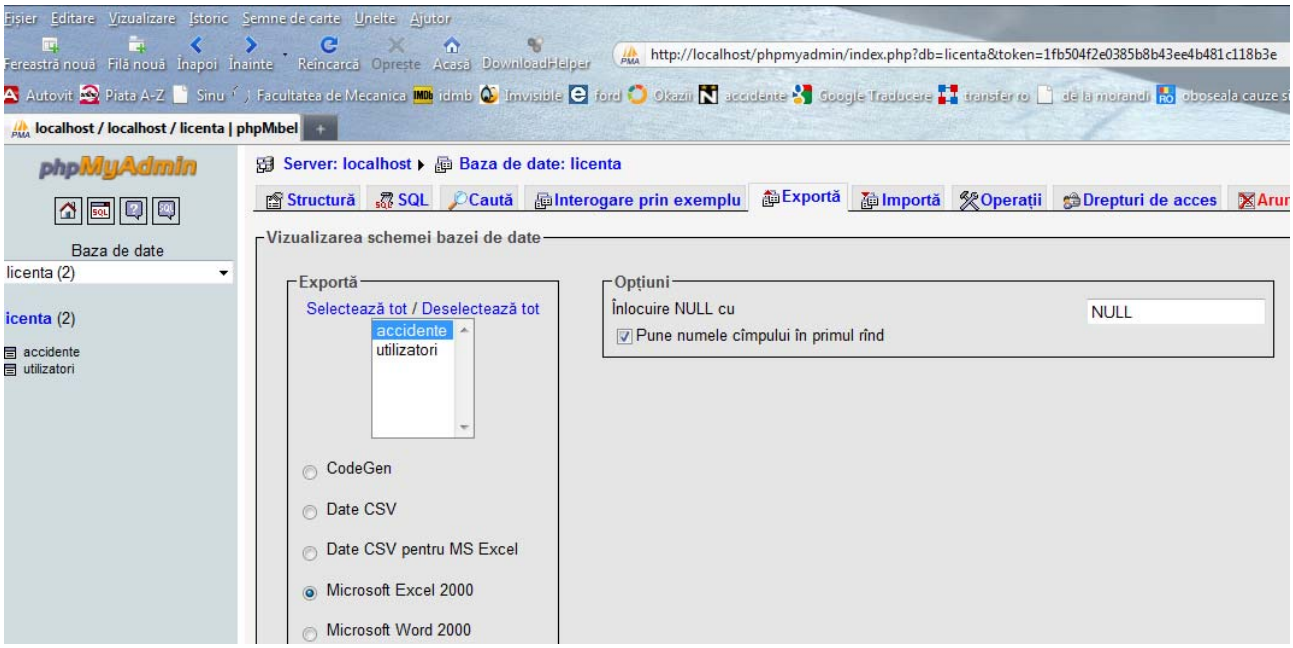
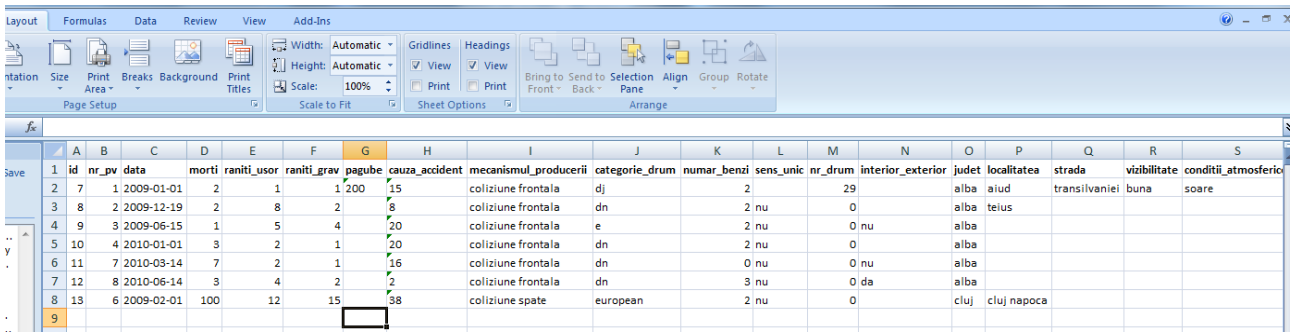


Fig. 15. Exporting the Excel database.



id	nr_pv	data	morti	raniti_usor	raniti_grav	pagube	cauza_accident	mecanismul_producerii	categorie_drum	numar_benzi	sens_unic	nr_drum	interior_exterior	judet	localitatea	strada	vizibilitate	conditii_atmosferic
7	1	2009-01-01	2	1	1	200	15	coliziune frontala	dj	2		29		alba	aiud	transilvaniei	buna	soare
8	2	2009-12-19	2	8	2		8	coliziune frontala	dn	2	nu	0		alba	teius			
9	3	2009-06-15	1	5	4		20	coliziune frontala	e	2	nu	0	nu	alba				
10	4	2010-01-01	3	2	1		20	coliziune frontala	dn	2	nu	0		alba				
11	7	2010-03-14	7	2	1		16	coliziune frontala	dn	0	nu	0	nu	alba				
12	8	2010-06-14	3	4	2		2	coliziune frontala	dn	3	nu	0	da	alba				
13	6	2009-02-01	100	12	15		38	coliziune spate	european	2	nu	0		cluj	cluj napoca			

Fig. 16. Exported database to Excel.

5. INSTITUTIONS THAT MAY BE INTERESTED BY THIS DATABASE

Among the potential beneficiaries of such a database, with the possibility of bringing a contribution to reducing the number of road accidents and smooth road traffic, it can be mentions:

- various specialized structures at national level regional and / or local with road safety responsibilities;
- design and construction of the roads;
- different road users;
- various ministries such as Home Affairs (Traffic Police Department within the General Inspectorate of Romanian Police, Department for Driving Licenses and Vehicle Registration) Regional Development and Public Administration; health; Transport (National Company of Motorways and National Roads in Romania, Romanian Road Authority, Romanian Auto Register) economy; Education; Public Finance; Labour, Family and Social Protection for the Elderly; Information Society; Youth and Sports; Agriculture and Rural Development etc.;
- local government authorities (local councils, city halls, county councils);
- specialized bodies of the central government (National Institute of Statistics).

6. THE COST OF ROAD ACCIDENTS

The use of collection and processing software on accidentology data, as shown in this paper (BDA), which can be accessed by all institutions involved in road safety,

significantly would reduce the data collection time and implicitly could be taken road safety measures more quickly. The software allows instant data interpretation thus quickly identifying the major risk areas in which must intervene immediately.

The implementation of such software (BDA), would lead to a reduction of at least 7% the number of road traffic accidents, and implicitly the number of deaths due to the road accidents, reducing in this regard the economic and social costs of state. Obviously, these amounts must be subtracted from the cost of the software implementation at national level, costs that not represent more than 10% of these amounts.

7. CONCLUSIONS

The urgent need to find ways to reduce road accidents is found as a continuing concern among researchers in the field, in most world countries.

Achievement of a software on accidentology of data collection and processing is beneficial to all institutions involved in road safety. With such a software would significantly reduce economic costs due to the road accidents, have become unbearable costs anyway.

The economic costs due to the accidents are increasing rapidly and without people involved in road safety these costs can reach values unbearable for our country. Because these costs which it raises road accidents is imperative to develop a strategy for reduce them.

Thus has attempted the achievement of data interpretation software to provide as quickly as possible and efficient processing them in order to provide optimal solutions in a short time for the road safety.

The developed software allows an objective and operative interpretation of the data contributing to some measure to reduce the number of road accidents or at least reduce the deceased or injured persons as a result of road accidents. Implementation of this software requires certain costs, but these are very small compared to the economy that would result from reducing the road accidents.

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POSIBILITĂȚI DE CREARE A UNEI BAZE DE DATE ACCIDENTOLOGICE

Rezumat: Programul BDA (Bază de Date Accidentologice), de colectare şi interpretare a datelor accidentologice, s-a realizat în scopul asigurării prelucrării cât mai rapide şi eficiente a acestora, indentificându-se cu rapiditate zonele cu risc major în care trebuie intervenit imediat, pentru a putea oferi soluții optime într-un timp cât mai scurt pentru siguranța circulației rutiere. Se urmăreşte astfel, într-o oarecare măsură, să fie adusă o contribuție la reducerea numărului accidentelor rutiere sau cel puțin la reducerea cazurilor de persoane decedate sau rănite ca urmare a accidentelor rutiere. Exploatarea BDA permite o interpretarea obiectivă şi operativă a datelor accidentologice în timp real (interpretarea grafică şi tabelară). Programul BDA, proiectat special pentru WEB, poate fi accesat doar de către utilizatorii înregistrați. Implementarea BDA presupune anumite costuri, însă acestea sunt foarte mici în comparație cu economia care s-ar realiza prin reducerea accidentelor rutiere.

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