The paper examined which risk type was most frequently notified on motor vehicles and what was its relationship with: year, notifying country, country of origin, and measures adopted by the notifying country. The data originated from Rapid Alert System for dangerous non-food products (RAPEX) database and concerned the period from 2005 to 2015. The cluster analysis and scatterplots using Statistica 12 was adopted. It was found that the risk type was directly related with the notifying country, followed by: year, country of origin and measures adopted. The most frequent risk was injury and the number of notifications in this area have increased over the last years. The notified motor vehicles originated predominatingly from Germany and also this country most frequently notified these products. The measures towards to notified vehicles were usually taken by the economic operator.

INTRODUCTION

The legal basis for the Rapid Alert System for dangerous non-food products (RAPEX) is the directive 2001/95/EC on general product safety [5]. Obligations for producers, distributors and also obligations and powers of the countries within the area of motor vehicles were given in the Guidance Document on the Relationship Between the General Product Safety Directive (GPSD) and Certain Sector Directives with Provisions on Product Safety (Directives on Medical Devices, Construction Products, Machinery, Medicinal Products and Motor Vehicles) [1].

The RAPEX enables quick exchange of information about dangerous non-food products posing a risk to health and safety of consumers [3] with the exception of food, pharmaceutical and medical devices [2, p. 8]. The information is exchanged between the national contact points of 31 countries (28 European Union countries and Iceland, Liechtenstein and Norway) and the European Commission, and also the EFTA (European Free Trade Association) Surveillance Authority. After finding a dangerous product in the notifying country measures are adopted in order to prevent or restrict its marketing or use. They can be ordered by public (national) authorities as compulsory measures or can be taken directly by the economic operator (producer or distributor) as voluntary measures [3]. The reaction is, however, the information received from country participating in the RAPEX on the follow-up action taken in response to the notification [2, p. 8].

In 2015 motor vehicles with 214 notifications and 1943 reactions constituted the third most frequently notified product category in the RAPEX (after toys and clothing, textiles and fashion items) [4, p. 6, 17], see also [8, p. 11] and in 2014 it was the fourth product category with 194 notifications and 1714 reactions (after electrical appliances and equipment) [2, p. 13, 26]. Among the risks most frequently notified last years in the RAPEX were: injuries, chemical and choking [2, p. 20; 4, p. 9]; however, the annual reports didn’t indicate the relationships between the product category and the risk type. Therefore, the goal of the study was to examine which risk type was most frequently notified on motor vehicles and what was its relationship with: year, notifying country, country of origin, and measures adopted by the notifying country (hereinafter referred to as measures adopted).

1. DATA AND METHODS

The data originated from the RAPEX database relating to 1748 notifications within motor vehicles in 2005-2015 and concerned five variables: risk type, year, notifying country, country of origin and measures adopted by the notifying country [3]. Besides, for this data serious risk (within risk level) and consumer (within product user) was adopted. The fields with no data were filled in with “(not specified)”. The data was collected in Excel and then transferred to Statistica 12.

In order to examine the relationship of the risk type and other variables using the cluster analysis the following settings were adopted: joining (tree clustering), linkage rule: complete linkage, distance measure: Euclidean distance. K-means clustering was also applied as another cluster analysis method indicating two, three and four clusters. Then, the relationships between the risk type and other variables were presented graphically in (bubble) scatterplots.

2. RESULTS AND DISCUSSION

The results of the cluster analysis making use of joining (tree clustering) are presented in Fig. 1.
tively: year, country of origin and measures adopted (the variable
farthest from the other variables). This was confirmed when k-
means clustering was applied (Tab. 1).

<table>
<thead>
<tr>
<th>Clusters number</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>measures adopted; notifying country, year, risk type, country of origin</td>
</tr>
<tr>
<td>3</td>
<td>measures adopted; country of origin; notifying country, risk type, year</td>
</tr>
<tr>
<td>4</td>
<td>measures adopted; country of origin; year; notifying country, risk type</td>
</tr>
</tbody>
</table>

The variables representing clusters were separated by semicolons and within each single cluster particular variables are arranged
in order from the cluster centre. When only two clusters were indi-
cated the variable measures adopted was the one-element cluster
and the other four variables were the second cluster. When more
clusters were indicated other one-element clusters were formed.
And so, in case of indicating four clusters three one-element clus-
ters were formed and one two-element cluster consisting the vari-
ables: risk type and notifying country, similarly as in Fig. 1.

In Fig. 2-5 the relationship between risk type and respectively:
year, notifying country, country of origin and measures adopted was
presented. Each of these figures indicated practically only injuries
(and to a much lesser extent also fire) as risk type notified on motor
vehicles.
The number of notifications on injuries increased last years (Fig. 2). Germany, followed by Japan, France, the United States and the United Kingdom were the countries, from which notified motor vehicles originated (Fig. 4). Simultaneously, Germany was the most frequently notifying country (in Fig. 1 the relationship between risk type and notifying country is direct), followed by Greece and Portugal (Fig. 3). The measures to motor vehicles notified were taken by economic operators (Fig. 5).

In 2014 and 2015 Germany was the leader in passenger car production in Europe (over 5 million cars) [7]. The data from the RAPEX is used by the European Union and German Federal Motor Transport Authority to analyze and evaluate risks stemming from product defects after it marketed in view of the necessity and urgency of product recalls. In the risks classification injury severity and probability of harm were assessed [9, p. 611-612]. The measures related to the RAPEX notifications were voluntary, which meant high awareness of economic operator (producer or distributor) within consumer safety.

However, the most common example of the worldwide action was taken by Toyota Motor Corporation in 2008-2011. More than 9 million cars were then recalled after the reports of unintended acceleration caused by floor mats, acceleration pedal and unrelated anti-lock brake [6, p. 715].

SUMMARY

The use of joining (tree clustering) in the cluster analysis indicated a direct relationship of the RAPEX notifications on motor vehicles between risk type and notifying country, and subsequently this relationship referred to: year, country of origin and measures adopted. The similar results gave the applying k-means clustering. The risk most frequently notified was injury and, to a much lesser extent, also fire. The number of notifications increased last years. The notifications concerned mostly motor vehicles originated from Germany, followed by vehicles from Japan, France, the United States and the United Kingdom. Germany was the country, which most frequently notified motor vehicles, followed by Greece and Portugal. The economic operator (producer or distributor) usually took the measures towards the notified vehicles.

REFERENCES


