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Comparison of Fastening Methods of Military Vehicles on Railway Freight Wagons Using Fastening Straps

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The paper identifies possible ways of fastening military vehicles on rail freight wagons using textile fastening straps and then compares particular methods. The comparison includes, besides used methods—diagonal lashing and V-shape diagonal lashing, the previously used method of lashing—slope lashing, which is currently not allowed to use. To calculate the inertia forces affecting the cargo, respectively the fastening straps, appropriate methods in accordance with EN 12195–1 have been chosen. In the discussion part, recommendations in relation to the fastening of military vehicles on rail freight wagons are introduced.
Keywords: *fastening, fastening straps, inertia forces, railway freight wagons*

Introduction

Railway transport represents an important mode of transport for the Army of the Czech Republic. On the one hand railway transport is not so suitable for transportation of small amount (number) of military vehicles and material for a short distance, on the other hand it is quite effective for transportation of large amount (number) of military vehicles for medium and long distance. The paper is focused on railway transport of ground military vehicles with emphasis on transport selected tracked vehicles. When transporting, in any mode of transport, inertia forces act on the carried cargo. Although the exact size of forces is unknown before the start of transport, it can be assumed from the empirically determined acceleration coefficients that are part of the relevant standards (e.g. EN 12195–1). [1] In case of military transfers and transports, the ground military vehicles must be fastened taking into consideration the assumed size of the inertia forces. It is necessary to choose the method of fastening taking into account the type and weight of the ground military vehicles and the type of railway freight wagon. If the cargo—ground military vehicle is incorrectly or inadequately fastened, during the railway transport it may shift, fall, etc. which can cause damage to the fastening material, cargo (ground military vehicles) or railway freight wagon. In extreme cases, after the railway transport itself, the incorrect unloading may result in injuries to the unloading group.

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Basic Principles of the Fastening of Ground Military Vehicles to the Railway Freight Wagons

Freight fastening, ground military vehicles in this case, is being proceeded in accordance with the provision Allied Movement Publication STANAG 2468 CSS (Edition 2): Technical Aspects of the Transport of Military Materials by Railroad AMOVP–4(A), [2] eventually Loading guidelines UIC – International Railway Union, [3] Volume 2 – Goods, eventually with Guideline of CDC for provisioning of military rail transport to the code D33. [4]

According to the previously mentioned regulation, it is possible to use the following material for fastening ground military vehicles: [2] [3] [4]

- wedges with steel thorns;
- wooden wedges;
- underlay wedges;
- locking wood;
- binding wires;
- wheel stops;
- fastening straps.

This article will focus on one of the most frequently used fasteners according to the conditions of The Army of the Czech Republic—a fastening strap. A critical value for fastening straps is the Lashing Capacity (LC), which sets the maximal load – pulling force, which is guaranteed by the producer and to which the fastening strap is dimensioned.

The value of the Lashing Capacity cannot be confused with the Breaking Force (BF), which shows the power during a rupture, for which the fastening strap is designed (EN 12195–2). [5] The producers ensure, for safety reasons, sufficient difference between LC and BF, that in case of improper use of the fastening strap, meaning its overloading, will not end up in immediate rupture. During the use of a fastening strap for heavier freight or generally during the effect of stronger than assumed inertial forces, the lifetime of the individual strap components is reduced. Responsibility for any damage is an important aspect, that is why the producer guarantees possible *tension* only until the moment, when:

$$F_{x,y,z} \leq LC \quad (1)$$

- where $F_{x,y,z}$ represents a general list of inertia forces acting in axes (x, y and z).

In accordance with source [2] and [3], ground military vehicles fasten differently on the front, respectively on the rear of the vehicle. From the front of the ground military vehicle, the straps are guided diagonally in the shape of the letter *V,* from the rear of the ground military vehicle, they are lead diagonally by crossing. (Figure 1) [6]

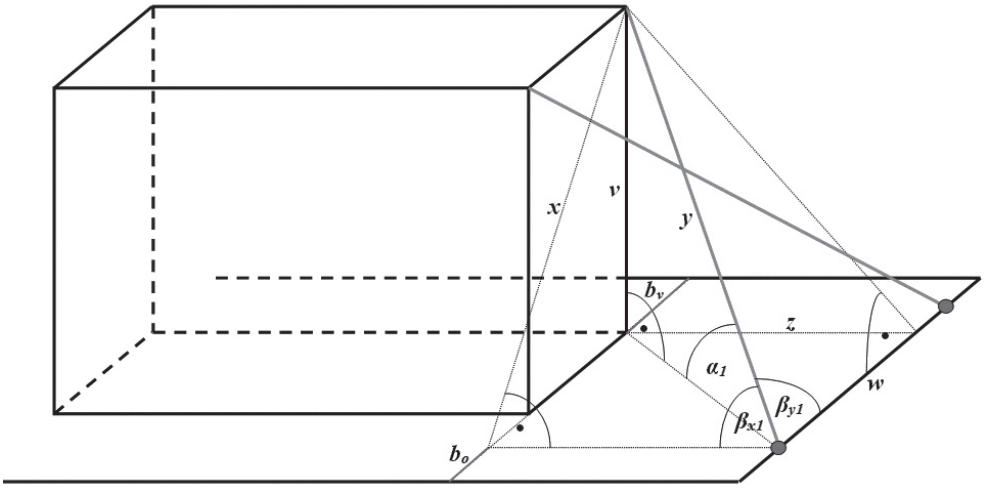

Figure 1. *Fastening model – diagonally by crossing of the ground military vehicle on a railway freight wagon.* [Edited by the author.]

The anchor points on the ground military vehicles and their distance from the anchor points (steel holes) of the freight wagon are decisive for fixation in this way. The provision [5] specifies the angle, which should be used to fasten the fastening strap with the imaginary surface of the ground military vehicle, to be 30°. (Figure 2.) In real conditions, it is possible to choose any anchor point on the railway freight wagon, which has its angle as close as possible to the required 30°.

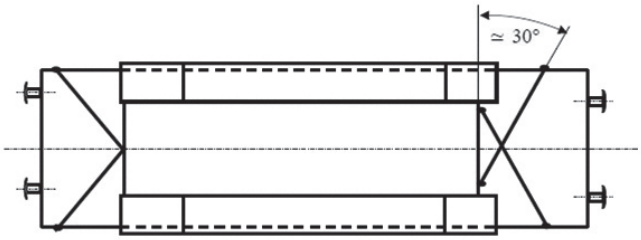

Figure 2. *Fastening of ground military vehicles on a railway freight wagon using fastening straps.* [2]

Fastening Model of Infantry Combat Vehicle

The key factor in the fastening of required ground military vehicle is the correct choice of a railway freight wagon, which matches that military vehicle in its length, load capacity and positions of the anchor points. Especially the above mentioned angle (Figure 2) provides sufficient ability to fasten a military vehicle. This requirement is especially much more significant to military vehicles with a higher weight, such as tracked vehicles, for which

it is assumed to have higher values of inertial forces (Fx, y, z). Available freight wagon length and ability to load the ground military vehicle on a railway freight wagon is analysed in the paper. [6] For the purposes of this paper, there will be discussed the parameters used in the following formula, which is based on EN 12195-1 standard: [1]

$$F = m \cdot g \cdot \frac{(c_{x,y} - \mu \cdot f_{\mu} \cdot c_z)}{2 \cdot (\cos \alpha \cdot \cos \beta_{x,y} + \mu \cdot f_{\mu} \cdot \sin \alpha)} \; [N] \tag{2}$$

- where F is the searched inertial force (inertial forces), which can be expected during the transportation by parameters of the ground military vehicle, railway freight wagon, railway track and other conditions (e.g. weather conditions), m means the weight of the cargo—ground military vehicles, g means gravitation acceleration, $c_{x,y,z}$ means the acceleration coefficient in the appropriate axes, μ means dynamic coefficient of friction, f_{μ} recalculating coefficient of friction, α, $\beta_{x,y}$ represents the angles, which are held by the used fastening straps with appropriate surfaces. (Figure 1)

Model assumptions:

- the cargo is made of military fighting vehicle BVP–2, which is in service of the Army of the Czech Republic; (Table 1)
- four-axle railway freight wagon series Smmps 54 in technical interval 4728 (Table 2) is used for transport of BVP–2;
- BVP–2 is, on the railway freight wagon, centred both longitudinally and transversely in the axle of the railway freight wagon;
- for fastening there are used anchor points in the front and the rear part of the vehicle (on Figure 1 they are demonstrated by the top edges of the model block);
- for fastening normally used fastening straps with LC = 5,000 daN or 10,000 daN are used.

To determine the searched inertial forces, respectively the restraining force of the lashing straps, the values from Table 3 and B.1 in source [1] should be used; to determine the size of relevant angles (α, β) the corresponding trigonometric functions and the Pythagoras theorem are to be used.

Basic input data are derived from the Tactical–Technical Data of the transported cargo (BVP–2) and the used railway freight wagon (Smmps 54 at the Technical Interval 4728). The selected data is summarized in Tables 1 and 2.

Table 1. *Basic technical parameters of BVP–2 are used in the calculation.* [7] [8]

Parameter	**Value**	**Unit**	**Note**
Weight (m)	14,300	kg	
Width	2,700	mm	
Height (v)	1,600	mm	Lashing point at the same height.
Length	6,720	mm	

Parameter	Value	Unit	Note
Distance 1 (bv)	350	mm	The distance of the fastening points on the vehicle from the side edge of the railway freight wagon.
Distance 2 (z)	3,000	mm	The distance of the fastening points on the vehicle from the surface where the anchor points are located on the railway freight wagon.

Table 2. *Basic technical parameters of the Smmps 54 railway wagon in the technical interval 4728 are used in the calculation.* [8]

Parameter	Value	Unit	Note
Loading length	14,000	mm	
Loading width	3,100	mm	
Wagon width (w)	3,100	mm	
Distance 3 (bo)	200	mm	The distance of the fastening points from the side edge of the railway freight wagon.

The acceleration coefficients and friction factors from Table 3 are also used for the calculation. The values of the acceleration coefficients apply to railway transport. Interestingly, the values of the acceleration coefficients presented in *The Regulation concerning the International Carriage of Dangerous Goods by Rail (RID),* which is the connection C to *The Convention concerning International Carriage by Rail,* are higher.

For the friction factor, two values are used (Table 3) which demonstrate the difference between track and wheel vehicles. However, the calculation abstracts from the larger contact area in case of tracked vehicles. This could reduce the difference between calculated inertia forces for track and wheeled vehicles. The value of friction factor 0.6 is used only to model the illustration difference in access to different types of vehicles (track versus wheel).

If necessary, special cover can be used on straps or special anti-skid surfaces on the transport vehicle. However, the use of anti-skid surfaces is not applied very frequently in railway transport (in particular railway freight wagons). Frequent use of anti-skid surface is used in road transport. In combined transport there is the possibility of using removable transport platforms or storage containers, where the type of floor is variable and the customer requirements (in this case the army) are met.

Table 3. *Values for calculating inertia forces.* [1]

Parameter	Value	Unit
Gravitational acceleration (g)	9.81	$m \times s^{-2}$
Coefficient of longitudinal acceleration (cx)	1.0	–
Transverse acceleration coefficient (cy)	0.5	–
Coefficient of vertical acceleration (cz)	1.0	–
Conversion factor for friction (fμ)	0.75	–
Friction factor – tracked vehicles (μt)	0.3	–
Friction factor – wheeled vehicles (μw)	0.6	–

Finally, Table 4 summarizes the sizes of angles, which are required to calculate the inertia forces. For the first set of angles *(α1, βx1, βy1)* Figure 1 can be used, other schemes for further types of fastening (slope lashing and V-shape diagonal lashing) would be analogous. Angle calculations are based on Tables 1 and 2.

Table 4. *Angle sizes and their specifications.* [Edited by the author.]

Sign	Specification	Angle size	Unit
α_1	Angle for crossed diagonal lashing	22.12	°
α_2	Angle for slope lashing	28.04	°
α_3	Angle for V-shape diagonal lashing	25.94	°
β_{x1}	Longitudinal direction – angle for crossed diagonal lashing	45.10	°
β_{x2}	Longitudinal direction – angle for slope lashing	28.18	°
β_{x3}	Longitudinal direction – angle for V-shape diagonal lashing	34.91	°
β_{y1}	Transverse direction – angle for crossed diagonal lashing	53.13	°
β_{y2}	Transverse direction – angle for slope lashing	87.47	°
β_{y3}	Transverse direction – angle for V-shape diagonal lashing	68.34	°

The size of the individual angles fundamentally affects the resulting inertia force that acts on the strap and is determined by the type of fastening. The corresponding type of fastening corresponds to the formula (2) resulting from EN 12195–1. Different influence of the angles on the final calculation is demonstrated, for example, by a contribution in the proceedings. [9]

Using the input data from Tables 3 and 4, the required sizes of inertia forces are calculated, which must correspond to the permissible load-carrying capacity—traction force (LC) of the used fastening straps. The inertia forces are calculated for the x and y axes, for each of the three fastening methods and for two different sizes of friction factor (for μt = 0.3 and model value for μw = 0.6). The values of inertial forces are summarized in Table 5, showing the size of the inertial forces, i.e. regardless of their direction (sign).

It can be seen from Table 5, that there are large differences between sizes of inertia forces in individual axes using different fastening methods. Red highlighted is the prohibited method of fastening—slope lashing, which is the cause of the prohibition of using the inappropriateness of *protecting* the cargo against the undesirable effects of transverse inertial forces. In Table 5 it is the force F2y = 13.327 daN, which significantly exceeds the value of the commonly used fastening strap with LC = 10,000 daN. In general, it is clear that the lashing slope is a very appropriate way of fixing against the effects of longitudinal inertial forces (F2x), but very unsuitable against y-axis forces (F2y). From the values of the other inertial forces that are calculated for the remaining two fastening methods, respective two axes (x and y), it is obvious that inertia forces are between 3,011–7,359 daN. For fastening BVP–2 to the relevant railway freight wagon, it is necessary to use fastening straps with LC = 10,000 daN. The straps with LC = 5,000 daN would not have sufficient x-axis lashing capacity for both methods of fastening (cross-diagonal lashing and V-shape diagonal lashing). The sizes of the inertia forces found at the same time demonstrate the advantage of using the combination of the two fastening

methods, because one is more suitable for fastening ground military vehicles in the longitudinal direction and the second in the transverse direction.

Table 5. *Sizes of the searched inertia forces.* [Edited by the author.]

Sign	**Specification**	**Value for** μt	**Value for** μw	**Unit**
F_{1x}	Crossed diagonal lashing (x axis)	7,359	4,685	daN
F_{2x}	Slope lashing (x axis)	6,151	3,899	daN
F_{3x}	V-shape diagonal lashing (x axis)	6,503	4,129	daN
F_{1y}	Crossed diagonal lashing (y axis)	3,011	484	daN
F_{2y}	Slope lashing (y axis)	13,327	1,400	daN
F_{3y}	V-shape diagonal lashing (y axis)	4,482	663	daN

The theoretical model, which evaluates the hypothetical possibility, where BVP–2 is a wheeled vehicle with the same values but with a friction factor of (μw), is mentioned in the next column in Table 5. Due to its doubled friction factor value (μw=2 μt) the inertial forces are significantly smaller in both axes than in the real *tracked version* of BVP–2. In the y axis, the inertial forces (F1y, F3y) are insignificant, in the y axis they do not outreach 5,000 daN (F1x, F3x) and for that purpose it would be possible to fasten the model vehicle with no problems only with fastening straps with lashing capacity LC = 5,000 daN.

Conclusion

The submitted contribution demonstrates important knowledge of the basic parameters of the transportation right before the commencing of the transport. The basic inputs were mentioned in the formula (2), where the values are given by the cargo (its weight), norm (EN12195–1), contact surfaces between the transported vehicle and the railway freight wagon and the angles, which are held by the fastening straps with appropriate surfaces. Certain deficiencies are the normative values of the acceleration coefficients, which can be different (higher) values during the real transportation (see e.g. [10] [11] [12]).

The calculation of the transportation model points to the importance of using allowed ways of fastening and to the right choice of anchor points on the railway freight wagon. The right implementation of the mentioned activities ensures effectiveness and safe course of the railway transportation.

Subject of the following research will be verification and statistical evaluation of real-valued acceleration coefficients. Subject of the analysis will not be only transportation, but mainly the train composition, where it is possible to assume significant size of the inertial forces in the x axis. Important factor will be the consideration of the choice of the right railway freight wagon, which will allow not only the load of the ground military vehicle, but also its proper fastening. In this respect can be the compliance of the required angle of 30° considered as one of the key factors, as Figure 2 implies.

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Correlation Between the Relation to Work and Social Intelligence Among the Mayors in the Slovak Republic

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The aim was to identify the relationship between the relation to work and social intelligence according to its individual factors. The subject of the research was the mayors of municipalities in Slovakia. The survey was attended by 787 mayors from a total of 2,753 (28.5%). To obtain the empirical data, a standardized social intelligence questionnaire based on MESI's psychometric approach was used, and the questionnaire finds a relationship with Job Satisfaction Instrument (JSI). The results of the research were processed using the SPSS 21 statistical software. To test the nature of relationships and dependencies between variables and to test the tightness of the relationship between the studied variables, a correlation analysis was used using the Pearson correlation coefficient, which expresses the degree of tightness of the linear relationship between the two (interval) variables. Research has found that the higher the rate of social irritability the mayor has, the more positive is his relationship to the job.

Keywords: *relationship to work, performance, social intelligence*

Introduction

Most author definitions define social intelligence positively, such as the ability to act wisely in interpersonal relationships, the ability of a positive social interaction for both sides. Relation to work in terms of activity is the conscious attitude of a person, which is created by family upbringing, cultural and social values and the support of the organization. Relation to work as an attitude is reflected in its positive or negative direction. According to scientific knowledge and the results of previous research, the ability to cope with the social environment needs a high degree of social intelligence which is one of the factors of job satisfaction and positive relation to work.

Social Intelligence

The set-up of social intelligence was first defined by Thorndike as "the ability to understand and manage other people and to act wisely in interpersonal relations." [58: 229] The author, in his definition, has lent himself to the two-factor structure of the definition of social intelligence and within this structure he distinguishes cognitive elements (people of social intelligence) and behavioural elements (wise behaviour in interpersonal relationships).

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This is also understood as an ability to understand other people and social interactions and to apply this knowledge in leadership and influencing other people for mutual satisfaction. [39]

According to others (for example) [41] [28], social intelligence is defined as the ability to purposefully address various social problems, with social intelligence as a specific phenomenon, relatively independent of general intelligence, consisting of two components:

- perceptive—the ability to understand other people, the ability to know the other person and to choose the appropriate behaviour towards him/her, respecting the particularities noted;
- action, behavioural—the ability to act wisely in interpersonal relationships, a way of social behaviour that fulfils a particular intention of an individual.

Social intelligence also has its negative charge in the form of manipulative behaviour. The authors point out that social intelligence consists of perceptions about the inner states and moods of others, the general ability to deal with other people, knowledge of social standards and social life, the ability to orient themselves in social situations, the use of social techniques to manipulate, the ability to interact with other people, social attractiveness and social adaptation. [54] Social intelligence is an intelligence focused on the social world. [27]

Social intelligence has a very close relation to emotional intelligence because it describes two aspects of the same construct. The most existing definitions of social and emotional intelligence include one or more of the following abilities: to understand and constructively express emotions, [38] to understand the experience of other people and to create cooperative interpersonal relationships, to effectively manage and regulate emotion, to realistically manage new situations and to solve problems of personal or interpersonal nature, be optimistic, positive and internally motivated, as well as formulate and achieve goals. [5]

Emotional intelligence is part of social intelligence. [5] It is defined as the ability of man to control his emotions and the emotions of others, the ability to distinguish between emotions and to use social information to regulate thought and action. The authors described components of emotional intelligence such as:

- the perception of emotions;
- using emotions;
- understanding emotions;
- managing emotions.

Emotional intelligence is known by defining its content in 5 basic dimensions, namely:

a) ability to self-reflection (willingness and ability to think about oneself, to recognize oneself, strengths and weaknesses);
b) self-control (ability to adequately express emotions);
c) motivation (ability to excite others about an activity, engagement, creating a positive image of the world);
d) empathy (the ability to understand others, to feel their feelings in the workplace which is also important for customer orientation, multicultural sensitivity, ability to lead subordinates and work in a team);
e) social competency (ability to manage different forms of human interaction through communication, conflict resolution, respect of social norms and rules, achievement of socially preferred goals, etc.).

Rational intelligence, referred to as rational intelligence is considered to be a basic prerequisite for the success of a person in all activities performed; it also forms the basis for the general readiness of a person to understand the roles and situations. The basic premise of efficient use of rational intelligence is emotional intelligence. It is more important than general intelligence, because in order to achieve an intelligent management of the demands of contemporary life, general intelligence is not enough. [28]

It is necessary to recognise social intelligence as one of the important predictors of effective behaviour of managers. Knowledge of social intelligence makes it possible to predict the manager's success in social contacts. [40] In order for managers to be successful in their work, they must know about the nature of their work and their activities at least as much as they know about their professional duties. It is necessary to realize that the manager is the person on whom the success of the whole society depends. This means that when selecting people for managerial positions, attention should be paid to the ability of a future wise and correct negotiation in interpersonal relationships. [26]

The concepts of social intelligence and social competency are very close. The basic difference is the importance of the set-up of social intelligence, which is used in a positive, neutral and negative sense, and in addition to the cognitive component it also contains a behavioural component. A person with a high degree of social intelligence can behave sacrificially and empathically, but he can also use people to his advantage using manipulative techniques. The form of social intelligence (or a negative manipulative or empathic attitude) depends on the circumstances of the situation, but also on the characteristics and character of the individual. Social competency involves only a positive significance in order to achieve positive social relations, social behaviour. It is therefore possible to characterise a high level of social competency as the ability to use interpersonal (social) subcomponents in order to fulfil the expected (desirable) social behaviour. Social competency and social intelligence are understood as a multidimensional structure.

The concepts of social intelligence, emotional intelligence and social competency are interpreted very similarly by the authors. Until the present day, there is no uniformly accepted definition that would correspond to the real phenomenon of social intelligence and social competency. The differences, resp. similarities of the structure of social competency and social intelligence is not the subject of our discussion. Social competency represents certain predispositions of the individual—the ability to develop and train through education and gain experience. Social intelligence involves a component of social competency and a component of behaviour—it manifests itself in behaviour.

Social competency has been defined as social dexterity in terms of a certain skill to pursue its objectives in social interaction. [4]

Social competency was characterized by Cavell [21] as an effective social behaviour. Guralnik describes social competency as the ability to successfully and adequately choose and implement interpersonal goals. [29]

To achieve success in the social and working world, social competency is fundamental. Kollárik said in defining social competency that it is a skill that unconditionally should be available to an individual—an employee who interacts with clients in different situations, fulfilling his requirements and providing services. [35]

Social competency is defined as the ability to induce and maintain satisfying human relationships. [33] Social competency seems a "dexterity and efficiency in social interaction

with people, based on respect for human dignity." [55: 45] Defining dexterity the author includes the ability to establish contacts, cooperative behaviour and also to reduce tension. The core of effectiveness is the achievement of goals, the ability to identify the social problem, and then to infer tactics in it, the ability to solve the problem, the ability to get a partner to cooperate or compromise.

Social competency is the ability of a person to appropriately promote himself/herself in social relationships, as well as to his/her loved ones, as well as to the conditions of his/her inclusion in society. The socially oriented individual is able to understand the necessity, but also the benefits of accepting his/her surroundings. [7] He/she knows how to adapt to others by preserving his/her individuality. Social competency is perceived more narrowly defined as a set of communication skills. [49]

When defining social intelligence, it is necessary to distinguish how an individual understands, interprets his/her own behaviour, other people's behaviour, and the way to behave efficiently – socially intelligently and act accordingly. Social competency is the ability of an effective and consistent [18] behaviour in order to achieve the goals, i.e. socially responsible behaviour. By Hupková's opinion developing socially responsible behaviour means improving self-reflection, social process reflection, social competency training as defined. [30] "… social competency in itself contains an a priori positive connotation in contrast to socially intelligent behaviour, which may have a manipulative, antisocial character". [44: 308] Social competency is a component of emotional intelligence. [43]

For knowledge and intervention, it is useful to know the contents of these psychological structures, often used and studied in management.

Social intelligence is defined by scholars as an ability to understand people, [39] [54] to be able to cooperate well with them, to maintain viable relationships that are useful to all actors. Social intelligence is the irreplaceable ability of the mayor of the municipality.

According to scientific knowledge, the ability to cope with the social environment is one of the factors of job satisfaction and a positive relationship to work. [22] [53]

Individuals with a higher level of social intelligence have the ability to recognize and reduce stress, understand the causes of stress, recognize conflict situations in the workplace and manage to solve them. They have the ability to recognize and control their emotions, achieve a higher level of self-confidence and self-awareness, have a positive influence on others, enhance positive emotions among the members of the working group, and thus increase the positive attitude towards their work as well as members of the working group.

Individuals with a low level of social intelligence are less aware of their emotions, have less ability to cope with stressful and conflicting situations. This inability reduces their job satisfaction and positive relationship to work.

Relationship to Work

Relation to work in terms of activity is the conscious attitude of a person, which is created by family upbringing, cultural and social values, and the support of the organization. Relation to work in terms of profession is linked to a particular individual because it determines the characteristics of the personality (abilities, interests, temperament and character) and the *taste* to carry out this work affects the organization (e.g. by stimulation, communication,

interpersonal relationships, leadership and leadership of the manager, work environment and technology). Relation to work as an attitude is reflected in its positive or negative direction.

There are four main forms of work relation. Relationship to work is of such *making* that creates society (community). [51] Furthermore, it is the relationship between work and occupation that is being prepared (career choice) and which one chooses. Richard Finn also defines the relation to the current work, which characterizes the taste, or the reluctance to work and, above all, this type of relationship affects the organization. It also defines the relation to the work previously done, which is formed by memoirs. As a rule, it is positive, because one tends to forget about unpleasant experiences. [25]

Relation to work greatly determines the job satisfaction. It is considered to be one of the most important working attitudes and an indicator highlighting the level of human equilibrium with work and its conditions. [47]

Work satisfaction is "a collective attitude, the formation of which involves partial attitudes towards individual aspects, a sign of work." [34: 56] It is a complex phenomenon that involves and combines objective factors—working conditions, external factors of the environment on the widest scale—and subjective factors related to the values of individuals, their needs, the level of motivation. In essence, the relationship between the individual and the outside world is the result of a serious psychic phenomenon. Work satisfaction is the response of an individual to work experience. [8] Satisfaction as an attitude towards work is reflected in the overall life satisfaction of a person and adequate integration into society. [36]

If the impact of these attitudes is positive, we are talking about a positive relationship to work. If it is negative, we are talking about a negative relationship to work. [8]

The main manifestations of a positive relationship to work are moral responsibility for work (adequate, expected fulfilment of duties), positive emotional relation to work, which is manifested by satisfaction, good mood, pleasure and employment, discipline, guidelines, standards, an initiative that presents itself with working willingness, entrepreneurship and creativity, worker activity and good quality of work. On this basis, a positive relationship to work can be defined as a favourable or positive emotional state resulting from the assessment of work or work experience. On the other hand, the negative relationship to work is manifested in particular by the moral irresponsibility of the work done (indifference), the negative emotional relation to work (dissatisfaction, disappointment), lack of competency, lack of initiative (avoidance of work), low activity (passivity, laziness, reduction of the working time), poor quality of work (non-behaviour, error, inefficiency). [51]

The positive attitude towards work manifests itself in an overall working behaviour, activity and willingness to work, with an effort to initiate tasks, satisfaction with working conditions and a positive orientation towards work and performance. [48] The negative attitude towards work is reflected in reluctance, when we do not want to be successful, persistent dissatisfaction with working conditions, inclination towards fluctuation, tendency to disturb relationships, conflicting behaviour, and negative orientation to work and performance. [36] The influence of the relationship with work points out that the relationship of man to work is formed over a long period of time, also through what man gives to work, how he perceives it and can manifest in different ways. In terms of work activity, the attitude of a person is therefore important to the work in general, but also to the work done. If the relationship is positive, work satisfies him/her, there is the possibility of self-realization, work does not burden him, he/she is active, creative, which also positively affects work performance.

In a negative relationship to work, it is the opposite. Man considers work to be evil, therefore he/she does not work properly and considers his/her performance burdensome. [24]

There is a significant relationship between work satisfaction and organizational devotion where one cannot exist without one another. To achieve a high level of job satisfaction, managers need to know and understand what their employees want from work, thereby contributing to increased job satisfaction and reduced job satisfaction. [19]

Survey conducted on a sample of 180 agents at the Mississippi State University Extension Service has shown that those individuals who show high job satisfaction are more concerned with the quality of work done and are more devoted to the organization. [37] According to the results of the study, there is no statistically significant relationship between sex and relationship to work. The research results further showed that there is no statistically significant relationship between the relationship to work and the personality type (the Myers Briggs Type Indicator — MBTI questionnaire). However, the results of the study confirmed that age affects work satisfaction. Older and more experienced individuals show greater job satisfaction and are more dedicated to the organization than younger and less experienced individuals.

According to research, [31] [42] there is evidence that there is a significantly positive relationship between engagement and performance. It states that these employees are more efficient employees.

The relationship between work environments examined characteristics and attitudes towards work. A relationship was found between salary, work experience, teamwork and job satisfaction. They point out that the higher the pay, the work experience the richer together with the informal relationships in the working group, so job satisfaction is higher and the job relationship is more positive, which applies equally to men and women. [23]

The impact of the relationship with work on the performance of the employee is shown in the results, which states that a positive relationship to work brings satisfaction from work and an increase in work performance. [6]

Aim and Object

The aim of the research was to analyse the connection between the relation to work and social intelligence (empathy, manipulation, social irritability) among mayors of municipalities in the Slovak Republic.

As a *hypothesis* it is assumed the existence of a connection between the relation to work and social intelligence (empathy, manipulation, social irritability) among mayors of municipalities in the Slovak Republic.

The subject of the research is social intelligence and relationship to work.

Objects of the research are the mayors of municipalities in the Slovak Republic.

Local self-government is carried out in Slovakia on two levels, namely by municipalities and higher territorial units. There are 2,753 municipalities in Slovakia (31 January 2015– source: Statistical Office of the Slovak Republic). [57] At the head of the municipality, the municipal mayor is elected by the mayor of the municipality for a four-year term of office. The mayor of the municipality is an elected local government official who is expected to be willing and have a professional attitude towards work for the development

of the municipality, as well as the needs and interests of its inhabitants. In the mayor's office, the performance of municipal self-government and local government is linked. [45] [46]

The mayor, as one of the bodies of the municipality, is governed by Act No. 460/1992 Coll. The Constitution of the Slovak Republic in Art. 69, which states that "the mayor of the municipality is the executive body of the municipality; administers the municipality and represents the community externally." [59] The position of the mayor is also regulated by Act No. 369/1990 Coll. on the general establishment, [60] Act No. 253/1994 Coll. on the legal status and salary of mayors of municipalities and mayors of cities, which in para. 2 says that the function of the mayor of the municipality is a public function which is not performed in the employment relationship, i.e. there is no working relationship between the elected mayor and the municipality. [61] Therefore, the mayor does not have a summary of the duties he has to carry out. Its position is characteristic of the performance of the function. According to para. 13 (1) of the Act on General Settlement, the execution of the duties of the mayor is considered to be a public function.

However, the mayor of the municipality does not establish an employment relationship, but the mayor's job defines the tasks he performs on a daily basis in the performance of his duties. It is important for the mayor to achieve a high level of quality work performance. To achieve an optimal level, a positive relationship to work as a performance determinant is necessary. Prosperity and community performance depend to a large extent on the relationship of the mayor to the job and to the function performed.

Methods

The standardized MESI (*M*anipulation, *E*mpathy, *S*ocial *i*rritability) questionnaire was used. It is set up by Frankovský and Birknerová, explores the degree of social intelligence based on psychometric approach in its three factors—empathy, manipulation, and social irritability—in order to obtain empirical data and verify the established hypothesis. [12–17] The questionnaire contains 21 items. The respondent is speaking on a 5-degree scale. The scale anchors vary from 1 never to 5—very often. The score achieved can range from 7 to 35 points for each factor, where 7 points represent a low level of the Social Intelligence Factor and 35 points to a high level of the Social Intelligence Factor. The reliability of the MESI questionnaire shows the calculated Cronbach alpha $\alpha = 0.79$. Reliability of individual factors demonstrates Cronbach alpha values: manipulation $\alpha = 0.831$, empathy $\alpha = 0.857$, social irritability $\alpha = 0.799$. The authors report the reliability of the individual factors: manipulation $\alpha = 0.845$, empathy $\alpha = 0.772$, social irritability $\alpha = 0.725$.

The standardized Job Satisfaction Instrument (JSI) [20] was used to measure the relationship to work; the authors are Brayfield and Rothe. This standardized questionnaire finds a relationship with work and has been used for a very long time since 1951. The questionnaire contains 18 statements expressing the attitude of an individual to his work, of which 9 statements are formulated in reverse. Relation to work is detected on a 5-degree scale. The anchors range from 1—completely disagree (i.e. the respondent disagrees with the statement) up to 5—completely agree (i.e. the respondent agrees with the statement). The score achieved can range from 18 to 90, with 18 points strongly negative to work, and 90 points have a strong positive relationship to work. The questionnaire reliability shows that

the Cronbach alpha values are α = 0.80. The authors reported questionnaire reliability is α = 0.87.

Statistical Analysis

The results of the research were processed using the SPSS 21 statistical software. To test the nature of relationships and dependencies among variables and to test the tightness of the relationship among the studied variables, a correlation analysis was used using the Pearson correlation coefficient, which expresses the degree of tightness of the linear relationship between the two (interval) variables. Through the analyses, we have respected the conditions of use of individual methods.

Results

The aim was to find out the connection between the relationship to work and social intelligence according to its individual factors—empathy, manipulation and social irritability among the mayors of municipalities in the Slovak Republic.

On the basis of the theoretical knowledge, we have formulated the assumption of the existence of links between the relationship to work and social intelligence among the mayors of the municipalities. To obtain the results, Pearson's correlation coefficient (r) was used.

Table 1. *The correlation between the relationship to work and social intelligence.* [Edited by the author]

Item	**Empathy**	**Manipulation**	**Irritability**
relationship to work	– 0.325**	0.009	0.274**

**(probability value – significance level) p≤0.01; weak correlation <±0.29; middle correlation ±0.30–±0.49, strong correlation ±0.50–±1.0.

Discussion

There is a significant relationship between the two factors of social intelligence, namely empathy and irritability, and the relationship to the function of mayors (Table 1). Significant relationship was not confirmed between manipulation and relationship to work. The findings confirmed the results of several studies, for example [1] [2] [32].

There is a moderately positive relationship between social irritability and work-relatedness, where r = 0.274, p<0.01. The higher the rate of social irritability the mayor gets, the more positive the relationship to the job. Mayors who are characterized by a higher score in the factor of social irritability may make nervous contact with other people. They are socially isolated, they limit social contacts with people. Their presence is irritating, they prefer performing their work independently. They may think they are pursuing their job

at the expense of social relations. And it can also be assumed that a high degree of social irritability predicts the individual work focus of the mayor.

Based on the results of the validation of the MESI questionnaire on the TSIS (The Tromsø Social Intelligence Scale) methodology—a socially irritable individual has a low level of social intelligence. The results of the positive correlation between low levels of social intelligence and work-relatedness are consistent with the results of the research. [3]

A surprising result is the existence of a significantly moderate negative relationship between empathy and work-relatedness. where $r = –0.325$, $p<0.01$.

More empathetic individuals experience a higher level of social well-being and at the same time their feeling that they are part of the society and community they live in is stronger. They feel they are important and beneficial for the community and have positive feedback. Mayors scrutinizing the empathy factor know how to recognize the intentions, feelings and weaknesses of other people. I can adapt the concession to people because they are geared to maintaining good interpersonal relationships. [9] [10] [11] They are spontaneously and completely naturally comfortable in the feelings of others, they know how to estimate their problems (both personal and work-problems), while willing to meet these problems and wishes. They can estimate how well people have to adapt and prefer good interpersonal relationships at the expense of work performance. As a result of such a process, it is in our results that we have a negative attitude towards avoiding the work done. [56]

It was found that a higher empathy rate increases the level of work satisfaction and contributes to a positive relationship to work, which does not coincide with our findings. [50] But we have confirmed the results of research that empathy negatively correlates with the relationship to work. [52]

It was found that empathy is negatively related to the relationship to work (the higher the empathy score, the more negative the relationship to work), and that work-related irritability is positively related, while the socially irritable individual possesses a low level of social intelligence that we consider necessary to perform the function of the mayor.

At the same time, it can be said that a low empathy rate and a high rate of social irritability predict individual work orientation, increase work-relatedness, and reduce the level of human orientation and relationships.

The result of statistical testing confirmed the hypothesis only partially. There is a relationship between the factors of social intelligence empathy, social irritability and the relationship to work with mayors of municipalities. There is no relationship between factor manipulation and work relationship with mayors of municipalities.

Conclusion

The results confirmed the relationship between social intelligence in the factors of empathy and social irritability and the relationship with the work of mayors of municipalities. It was found out that:

- the higher the degree of social irritability the mayor achieves, the more positive it is to work. A high degree of social irritability in the mayor of the municipality means inability to act socially, but at the same time indicates a more positive relationship

to work. A socially irritable individual has a low level of social intelligence which we consider necessary for the mayor's office;
- the higher the degree of empathy the mayor has, the more negative the relationship to the job. At the same time, it can be said that a low empathy rate and a high rate of social irritability predict individual work orientation, increase work-relatedness, and reduce the level of human orientation and relationships.

Based on the results, the author of research recommends:
- further exploration of interpersonal competency, social intelligence, and performance relationship. The results are not exhaustive for this explored issue and outline further possible research focus – for example, exploring the motives to serve as mayor of the municipality;
- the self-assessment of the mayors' own degree of social irritability and the subsequent consideration of one's suitability for performance by the mayor and prospective candidate.

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