

# PROPOSAL OF A METHOD FOR THE EVALUATION OF THE EMPLOYMENT POSSIBILITIES FOR PEOPLE WITH SPECIAL NEEDS ON WOODWORKING MACHINES

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## Abstract

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The employment opportunities for people with special needs in the field of woodworking have not yet been mapped out in the Czech Republic. All the current experience in this area has been directly acquired from individual protected and socio-therapeutic workshops.

As such, the research proposes a method for evaluating the employment opportunities for handicapped people when working on woodworking machines and this has become the main contribution of the thesis. The originality of the method consists in creating a questionnaire focused on the activity under examination which has been chronologically broken into individual sub-operations for which we have determined the degree of mastery and load rate for each worker. In case of failing to carry out a sub-operation, we have proposed possible measures to remove the barrier to enable the person to carry out the operation. A model of the method has been tested with one handicapped worker.

The basis for the work involved mapping out 4 protected workshops currently involved in woodworking. The research was undertaken by means of a personal visit to each individual organization and via consultation both with the leaders and with handicapped workers. Experience has shown that appropriate work adaptation enables the production of complicated wooden products such as musical instruments.

The proposed method specifies the work capacity of a particular person and technology on a particular piece of machinery when machining of a specific workpiece. As such, it ascertains the real causes of the barriers restricting handicapped people from performing the work and it should lead to the consideration and proposal of work conditions which compensate for a handicap so that a person with special needs can perform the work activity in consideration. The nature of the evaluation method means that it is suitable for protected workshops, socio-therapeutic workshops and organizations producing mass-produced products.

Keywords: Protected workshop, handicap, work utilization, socio-therapeutic workshops

## INTRODUCTION

Nowadays, psychologists, therapists, special needs teachers and non-profit organizations are mainly interested in finding jobs for people with special needs and they work at the level of mediators.

These people have excellent knowledge and experience in the field of handicap, mental illnesses and communication. However, they lack expertise from other fields and that is why they are unable to

mediate jobs for people with special needs, even in the area of occupational therapy, at a sufficient level which the person with special needs can handle.

The aforementioned opinion has been confirmed by experience. The senior workers at the protected workshops who had received a trade education and then subsequently came into contact with people with special needs were able to adapt the workflows and the work environment much more effectively than people with a social education.

The job opportunities for people with special needs in the field of woodworking have not yet been mapped out in the Czech Republic. All the current experience in this area has been established directly at individual protected and socio-therapeutic workshops, largely without expertise of woodworking.

An expert approach and methodical processes may open up a new view or new possibilities for the self-realization and employment for people with special needs.

The World Health Organization (2011) defines a handicap as: "a term, [which] we understand more as a disadvantage than as a disability. It manifests itself mainly in the limitation of the person's ability to perform an activity which he or she is otherwise capable of doing, but does not do due to this disadvantage. As such, a person with special needs is at a disadvantage when performing his or her social roles."

The reason for the research was to ascertain the actual degree of limitation for handicapped people when working with woodworking machines and to do so for each individual group of handicap. To this end, the research proposes a method of evaluating the possibility of employing handicapped people to work with woodworking machines and this has become the main contribution of this work.

The basic types of handicap can be divided into mental, sensual and physical handicap according to their individual manifestations (Michalík, 2011, Buřvalová, 2007). Each of the areas can also be divided according to the causes of the handicap.

Physical handicap constitute a very large group. A common feature of physical handicap is, however, the total or partial limitation of the ability to move. Such limitations can either involve direct handicap of the locomotor system (amputation, deformity, developmental defects, etc..) or secondary handicap such as disorders of the nervous system (as a result of heart defects, developmental defects or rheumatic and bone diseases) which lead to the limitation of movement and flexibility.

According to Jankovský (2006), a physical handicap generally means a handicap which manifests itself in the person in the guise of temporary or permanent problems of a motoric disposition. This includes disorders of the nervous system, if they cause a movement disorder. This may include various disorders of the musculoskeletal and skeletal systems.

Physical handicap can also be divided into three groups which demonstrate similar symptoms and limitations according to the origin of the handicap:

### **1. Central and peripheral paralysis**

The central section of the nervous system includes the brain, the spinal cord and part of the peripheral nervous system. The individual types differ from each other by means of their extent and severity and they are divided into paresis, partial paralysis and plegia – total paralysis.

Paralysis of the peripheral nervous system usually occurs after injuries to the upper or lower limbs when a nerve on the limb has been contused or interrupted leading to partial or total paralysis. Muscle strength and mobility are affected in the case of partial paralysis, but the limb hangs limp in the case of total paralysis.

Cerebral palsy arises before birth, during birth or soon after. People who have suffered from this illness are clumsy in their movements, especially in their fine motor skills. Other typical symptoms include restlessness, imperfect perception and imagination, uneven development, increased mobility and anxiety, desultoriness, impulsive reactions, frequent and intense mood swings, unbalanced mental performance, delayed speech development and speech defects. (Vítková, 2006)

Another cause of paralysis may be multiple sclerosis which is characterized by focal changes in the brain and spinal cord. It mostly affects people of working age.

Another such cause is the degenerative disease of the spinal cord known as Friedreich's ataxia which is caused by the degeneration of the spinal cord. It is typified by an unsteady gait. The disease usually begins to appear between the ages of 6–10.

### **2. Deformities**

Deformities are characterized by the incorrect shape of a body part. They can be innate or acquired during the patient's lifetime, especially after an accident.

Gained deformities can also be the result of improper postural habits. This is how some types of kyphosis and scoliosis develop (spinal deformities which are permanent and influence posture and movement). The causes may be internal or external. Internal causes may include hereditary influences, uneven growth or nutrition. External causes are a result of the environment such as a lack of movement, sitting infants up prematurely, sedentary jobs, obesity, a premature sports specialization, unilateral movements and so on.

Another group of deformities involves the improper development of the hip joint. The defect is caused by the underdevelopment of the hip or by its complete (luxation) or partial (subluxation) dislocation. The handicap tends to be one-sided or two-sided. (Vítková 1998)

Progressive muscular dystrophy is an illness, a so-called myopathy. It is an inherited metabolic disorder which leads to an illness of the muscles. This disease has two forms: the form affecting the shoulder girdle which is characterized by protuberant shoulder blades, shoulders protruding forward and changes in facial expression. This form has a good prognosis and it affects both sexes. The second form affecting the pelvic girdle is predominantly inherited. The muscles of the pelvis are initially affected, followed by the lower limbs (Monátová, 1997).

### 3. Malformations and amputations

A malformation involves the pathological development of various parts of the body and it belongs to the group of birth defects (Michalík, 2011). An amputation is understood to mean the artificial removal of part of a limb or an organ from another organism. A large percentage of amputations results from various types of injuries, but from a medical point of view the most frequent causes are malignant tumours, vascular diseases or infections which could cause severe sepsis.

Amputation mainly results in functional loss and at the same time the creation of a distinctly visible cosmetic effect. These circumstances give rise to an extraordinary life situation for the patient and can also evoke reactive mental disorders. Amputations are compensated for by means of various compensatory aids such as prostheses and technical aids which are meant to replace the lost parts of the body. (Renotiérová, 2003)

Each disorder involves a different degree of limitation. To this end has divided, (Kábele, 1993) physical handicap into three groups according to the dependence on environment:

A mild handicap (independence when satisfying physical needs, the probability of improvement in motoric or perceptual skills due to the influence of therapeutic intervention);

A moderate handicap (partial dependence when satisfying physical needs, functional control of head posture and movement, existing or potential deformities which limit the independence of function or cause pain, deficits of perception or sensorial integration which adversely affect the achievement of the academic and motor skills appropriate to the age).

A severe handicap (total dependence when satisfying physical needs, inadequate control of head posture, existing or potential deformities which cause functional limitations and pain, deficits of perception or sensorial integration which adversely affect the achievement of the academic and motor skills appropriate to the age).

It is also necessary to define terms such as defects and limitations for purpose of this work. Opatřilová, Zámečníková (2007) has defined them as follows:

Handicaps are defects of the supportive and motor systems which damage other organ systems or give rise to essential organ changes and deformities.

The limitation of performance means a quantitative limitation which causes qualitative changes of motion. It is measured in relation to normal performance depending on the age and the environment.

Nowadays, there is a tendency to help people with special needs as much as possible so that they can be as independent as possible. This is achieved by using all possible resources, such as medication, orthopaedic aids, job creation, the appropriate adjustment of furniture and assistive compensatory aids.

It is necessary to realize that each wheelchair user is a person with special needs and that the wheelchair is only a compensatory aid, but that the origins of the handicap (paralysis, deformity, malformation or amputation) and its severity continue to determine the general symptoms of the handicap.

Another large group involves visual handicaps. We acquire up to 80 % of the information that we need in everyday life by means of sight and that is why any damage to sight manifests itself in the way we contact our environment and in our spatial orientation. When assessing the entitlement of an individual to a handicap pension, visual handicaps are divided according to 3 standards: the level (the scope of damage is evaluated according to the degree of achieved visual acuity), the time of origin (innate, acquired) and the origin of the disease.

The most common types of sight defects can be divided into five different groups according to the affected functional components of the eye:

loss of visual acuity – individuals cannot see clearly, they have problems with distinguishing details;

visual field impairment – the spatial delineation which is seen by the individual; a limitation of visual acuity may also be apparent here;

oculomotor problems – occur during the faulty coordination of eye movements; the individual can have problems when using both eyes, while watching a moving object or viewing it, involuntary movements of the eyes may occur;

difficulties with processing of visual information – arise from damage to the visual centers in the cerebral cortex; individuals can have problems with processing information despite having no damage to the nerve or retina; problems with interpretation of visual information occur;

colour vision deficiency – disrupted colour perception causes either a partial defect so that a visually handicapped person cannot see one colour or a retinal cone defect so the person only has pigment for the base colour and only perceives shades thereof. (Květoňová-Švecová, 2000, Hycl *et al.*, 2003)

A mental handicap involves the reduction of intellectual functions as a result of the retardation or cessation of the development of the intellectual functions and abilities and it is permanent. It is caused by infectious diseases (paralysis) or damage of the brain. (Sapey *et al.*, 2014)

Mental handicap (Zezulková, 2013, Krejčířová, 2010) standardly affects all components of personality, each depending on the severity of the handicap and its character. A mental handicap often occurs in combination with other types of handicap (psychological illnesses, physical, sensual disorders etc.) and this results in further complicating and limiting factors for the handicap individual.

The division of mental handicaps (Švarcrová, 2011, Zezulková, 2013):

mild	IQ range:	50–69
moderate	IQ range:	35–49
severe	IQ range:	20–34
profound	IQ range:	0–19

The assignment into the individual groups is realized using standardized intelligence tests which identify IQ range. Categorization must only be used indicatively as it only corresponds to the momentary state of the mental functions which may develop over time with learning and rehabilitation. An overall assessment of a person must include other intellectual functions which are important for viability, communication, adaptation in the environment and manual dexterity. Gerbrich, (2009)

Morgan, (2014) considers the place and purpose of research evidence when working with disabled people. A central concern of the disabled people's movement and of its academic partner disability studies has been to highlight the way in which disabled people can be employable in production.

The last large group includes people with a hearing impairment. A basic mistake in the perception of deaf people involves the fact that most people consider them to be readers. However, only a small proportion of deaf people can actually read and this is mostly affected by the period when their handicap developed. People who have lost their hearing during their lifetime do not have any problems with reading, but people with congenital deafness perceive the written word in the same way that a healthy person perceives a foreign language.

Hearing impairments are divided according to the character of the hearing loss:

- hardness of hearing – the most common, a reduction in the intensity of auditory perception
- deafness – without any auditory perception
- hypersensitivity to all sound stimuli
- different tone perception
- excessively loud perception of the speaker's own voice
- tinnitus – the perception of non-existent sound
- the perception of only aperiodic sound (not tones, speech)

(Knox *et al.*, 2010) conducted on part of a wider study concerned with the collaborative efforts of an inquirer and six people with an intellectual disability, to develop a grounded theory explaining the processes by which these informants manage the relationships within their personal communities.

## MATERIALS AND METHODS

The work was based on the mapping out of 4 protected workshops currently involved in woodworking. The research was undertaken by means of personal visit of each individual organization and by consultation both with

the leaders and with handicapped workers. Five basic criteria influencing the utilization of people with special needs were ascertained in the workshops:

- 1) the basic goal and mission of the organization,
- 2) the method of leading workers with special needs in woodworking,
- 3) the activities performed by the person with special needs in field of woodworking and using woodworking machinery,
- 4) the equipment and workshop layout and
- 5) the goods produced in the protected workshop.

Social atelier Tilia from Nová Ves nad Popelkou (Atelier Tilia 2011) endeavours to be a place where people with various handicap can regain their self-respect. They teach traditional, almost forgotten, handicrafts and technics which require the feeling and warmth of human hands more than precision machinery.

The protected workshop has been designed as a form of art studio focussing on the production of wooden musical instruments and their development. The product range also includes objects d'art and custom-made wooden furniture.

There are currently 10 people working there with different handicaps (80% with blindness, psychological problems, schizophrenia, physical handicaps and mental handicaps), as well as three senior workers.

Another mapped protected workshop was Diaconia of the Evangelical Church of Czech Brethren – Resort Rolnička in Soběslav (Diakonie Českobratrské církve 2011). “The protected workshop currently employs 16 employees with mental and combined handicaps. The protected workshop's products combine craftsmanship with original artistic expression. Part of the workshop's production range includes products made from ceramics, wood, textiles, stained glass, beeswax candles and kaleidoscopes.”

The protected woodworking workshop is included in a complex of several other small protected workshops which work with other materials.

There are four employees with mild mental handicaps and one foreman in the woodworking workshop. Currently, the workshop primarily focusses on production and sales and these areas duly influence its operations and production program.

The most detailed research was undertaken in the V růžovém sadu protected workshop in Ořechov, near Brno where cooperation has been established and the method proposed below will be verified in the workshop's conditions.

As the workshop itself says: (Procházka, 2010) it is our aim to contribute to the quality of life of mentally handicapped individuals, while we also want to create a positive, realistic view of handicapped people in the rest of society by presenting their work results.

We endeavour to meaningfully occupy the time of mentally disadvantaged people by running a workshop for the production of wooden

objects. The medium is occupational therapy or preparation for employment with the aim of subsequent employment. We use a work program and technology which has been developed for this purpose.

Our goals and mission can be only fulfilled, if we maintain a personal approach to handicapped people and a willingness to help them develop individual abilities and options.

The workshop employs people with mental handicaps who would otherwise have difficulties when searching for a job in the labour market and in other standard protected workshops. At present, eight people with mental handicaps, one person with a mental disorder, two people with autism, one person with cerebral palsy and one with health problems are employed there.

The last visited workshop, Johannes von Gott-Pflegezentrum Kainbach, is part of the biggest institutions for mentally handicapped people in Austria. About six hundred people with mental and combined handicaps live in the institution. The institution operates fourteen workshops which are divided into two main types. The first type is therapeutic and uses the creativity of the handicapped as an opportunity for their self-expression. The second type of protected workshop cooperates with industry. The workers at these workshops assemble small pistons for the automobile factory, put coloured pencils into boxes for Faber-Castell or remove the insulation from cables to get copper for sale. The workers are required to be accurate, reliable and sometimes fast. The advantage of such a large institution lies in the fact that the handicapped employees can determine their working hours. Attendance is planned two weeks in advance and any remaining places are filled by others. The workshops are used by 120 clients and the necessary operations are secured.

The research into the individual protected and socio-therapeutic workshops has showed significant variations in the level of work utilization for handicapped people and the quality level quality of the produced products.

The major influencing factor for the aforementioned fields was the adaptation of the production technology and the method of managing the workers at work. The employees at all the visited protected workshops mainly worked only manually. Some employees could use hand-held electric tools, such as a cordless drill, an eccentric grinder or a router. In exceptional cases, they worked with a drill press, a band saw or a circular saw without any assistance. The use of the machinery was based on its technological adaptation in the form of devices which simplified the work with the machines and increased occupational safety.

The method of evaluating the capacity of people with special needs to work with woodworking machines has been further developed upon the basis of the facts acquired from the protected

workshops. We first had to establish the ascertained goal for its use, i.e. to define the actual subject of the investigation. The goal should include the technology and the product, because the ability to work can change with a change in the workpiece, so it is necessary to accurately define the semi-finished product that the person with special needs will work with.

It was also necessary to specify the demands placed on the employee in production operations based on the goal, both from the point of view of the machining and from the point of view of the employer's requirements: accuracy, reliability, speed, independence and stamina.

There can be differences in the design and fittings of machines which are of the same type, but come from different manufacturers and this can affect the method of control. For this reason, it is always necessary to ascertain the machining options for specific machinery.

Given the variety of handicaps and the different types of cabinetmaking machinery and their methods of use, it is necessary to evaluate each employee separately within the framework of each machining job.

The most important part of the method analyses the required machining and establishes a test protocol, as set out in the Tab. I. The table shows machining with a drill press divided into individual sub-activities which are marked in order with numbers and are furthermore divided into individual tasks marked with letters. The analysis pertains to the machining of a specific semi-finished product on a particular machine, so it has to take into account the way of handling the workpiece and controlling the machine.

The test protocol should include the name of the tested employee, the name of the person responsible for the testing, the test date, the technology, the type of machine on which the technology will be implemented and the designation of the semi-finished product or the precise specification thereof, if it is not part of the production documentation.

The practical section comes after the preparation of the test protocol, the training of the worker in occupational safety and the familiarization of the worker with the machinery and the test. Initially, we simulate each individual work task on the deactivated machine. This may show up a number of critical situations during which the person with special needs individual will not be able to handle the technology.

The next step is the testing of the manufacturing operation, provided no limitations have been found during the simulation which could give rise to the risk of injury.

Each task which the employee finds demanding or which could be a problem is marked in the testing protocol against the given sub-task, including the risks which may occur. The examiner also supervises the adherence to the safety procedures

I: *A record of the worker's ability to perform the work with a drill press.doc*

### Test protocol

<b>Name: Jiří Tříška</b>		<b>Date:</b>	<b>Technology: drilling</b>
<b>Workpiece: car semi-product, production document number 005.</b>		<b>Machinery: Woodster td 16 drill press</b>	<b>Examiner: Jan J.</b>
Order	Work activities and their analysis as sub-activities.	Evaluation	Possible Compensation
<b>1</b>	<b>SWITCHING THE MACHINE ON/ OFF</b>		
<b>a</b>	Switch operation	A	
<b>b</b>	Switch location	A	
<b>2</b>	<b>ALTERNATING RIGHT-HAND AND LEFT-HAND SPINDLE TRAVEL</b>		
<b>a</b>	Rocker switch operation (ability to push the switch)	A	
<b>b</b>	Switch location (the switch position is suitable, the worker can reach the switch effortlessly)	A	
<b>3</b>	<b>HANDLING THE WORKPIECE</b>		
<b>a</b>	Gripping the workpiece	B – the worker has to exert undue effort in order to be able to hold the workpiece, weak grip in fingers	Suitable compensation: a device for transferring the material, replace holding with pushing,
<b>b</b>	Lifting the workpiece	B – is able to lift it with difficulty, problem of fine motor skills	The semi-product should be placed directly next to the drill at the level of the work table, so that the lifting is replaced with pushing.
<b>c</b>	Positioning the workpiece in the desired position	C – the worker is lacking the fine motor skills for exact centring	A device, a stencil which centres the workpiece, mechanical clamping
<b>d</b>	Holding the workpiece during drilling	C – he does not have the required strength to hold the workpiece	Mechanical clamping, air pistons, placing the semi-product in a template.
<b>4</b>	<b>DRILLING</b>		
<b>a</b>	Holding the machine's lever	A	
<b>b</b>	Moving the lever to cut	A	
<b>c</b>	Returning the lever	A	
<b>d</b>	Extent of lever motion – depth of drilling	A	

and is ready to switch off the machine in the case of an emergency. Given that a handicap may also include absent-mindedness or the inability to concentrate for long periods, it is necessary to eliminate these risks during the preparation of production and the adaptation of the environment, for example using a suitable stepping device.

Three marks have been established for the evaluation during the test depending on the individual's work autonomy. These marks have been included in Tab. II. When the mark is

recorded in the test protocol, B or C is also added to the mark along with textual evaluation of the things which gave the employee problems. This can be seen in the evaluation column of Tab. I. If any of the sub-activities are marked B or C at any time during the test, it is necessary to propose a measure which compensates for the sub-activity in order to enable the employee to perform the task without any difficulties. The proposed measures should be written in the "Possible Compensation" paragraph of the test protocol.

II: *The method of evaluating sub-activities*

Mark	Meaning of the evaluation
<b>A</b>	The worker can perform the sub-activity independently without any problems.
<b>B</b>	The worker can perform the sub-activity, but finds the activity physically demanding.
<b>C</b>	Worker is unable to perform the sub-activity independently.

III: *The overall evaluation of the worker*

<b>Mild handicap:</b>	The worker's handicap allowed him to perform the work independently, the worker does not need any compensatory aids to use machine or any adaptation to the environment. The <b>handicap</b> does not influence the work performance.
<b>Moderate handicap:</b>	The disabled individual cannot manage some of the sub-activities in the technological operation independently or there is a risk of injury. Independent work would require the adaptation of the work environment, a change of technology and/or compensatory aids.
<b>Severe handicap:</b>	The person with full support is only able to perform some of the sub-activities independently on the woodworking machines and cannot complete the entire production operation.
<b>Profound handicap:</b>	The <b>handicapped</b> individual is unable to perform any sub-activity even with full support.

The protocol is evaluated after the completion of the trial section. The method proposes four groups according to the scope of the necessary support from the point of view of the overall evaluation of the work performed on the machine. These groups can be seen in Tab. III. The goal of the overall evaluation is to summarize employment options for the person working on the machine and to propose the suitable adaptation of the working environment for the employee in relation to the technical and financial options in the workshop.

**RESULTS**

**Proposal of a method for the evaluation of the employment possibilities for people with special needs on woodworking machines**

*The designation of the ascertained goal:*

To ascertain whether the worker Jiří Tříška could operate a drill press and drill accurate holes which had been clearly defined on semi-finished parts for a car toy. No machine preparation considered (the selection of a suitable drill, clamping the bit in the chuck).

*The requirements of the worker:*

This involves the small series production of toys in a protected workshop. The worker should perform the work on a drill press. The main requirement is for accuracy, speed is not so important.

*The machinery:*

A Woodster td 16 drill press

The main on-button is placed at the front of the machine. The drill allows right and left spindle rotation controlled by a dual-position switch. The machine is supplied with a chuck. The movement of the spindle is achieved using a lever mechanism.

*The overall evaluation*

The protocol shows that the worker needs help with four activities out of twelve. All of the available structural adaptations which could help to compensate for the handicap were

proposed during the evaluation of the individual's ability to perform the work. The following compensation for the worker's handicap would be suitable given the options of the protected workshop: the compensation set out in point 1) keep the semi-product at the level of the machining so that the worker can push the semi-products instead of lifting them and in point 2) it is suitable to create a low centring template so that semi-product fits into it and cannot change its position during drilling. This would solve the centring of the workpiece, as well as the clamping of the semi-product during drilling.

According to the test of his employment capacity during the machining of car semi-products on a Woodster td 16 drill press, Mr Jiří Tříška has a moderate handicap which requires the adaptation of the working environment so that he is able to perform the work safely.

**DISCUSSION**

To date, protected workshops and socio-therapeutic workshops have been the only organizations interested in employing handicapped people to work with woodworking machines and they have developed various approaches and methods in isolation in order to help these people do so. Only experience has showed that it is even possible to make complicated wooden products such as musical instruments with the suitable adaption of the working conditions.

The literature and professional articles studied have not yet uncovered this subject with any similar elaboration approach. The sources studied addressed the employment at the general level of universal inclusion and did not address any specific methods of work utilization. The proposed method has been built based on the studied area of disability, current practice of protected workshops and systematic procedure.

The classification of individual groups of handicaps and the numbers of different handicaps have led to the identification of the need to design a method focused on the individual as a person which unveils the extent of the individual's abilities.

This is based on the breakdown of the manufacturing operations into sub-operations. A practical investigation can then ascertain which sub-activities the person cannot handle. Based on that, further actions involving the modification of the technology or work environment can then be proposed.

The nature of the evaluation method means that it is suitable for protected workshops, socio-therapeutic workshops and organizations with mass production. It can also be adapted to different workshops according to specific needs. In socio-therapeutic workshops, the technology analysis can also take place at the level of individual movements. The efforts to compensate for the handicap will also be higher because of the goal of rehabilitation, while a company focused on productivity can set different criteria for the technology analysis and for the support which it is willing to invest in adapting the environment. As such, the overall evaluation of a worker and the proposed zone may differ.

A disadvantage of the evaluation method created is that it has to be tailored to a specific worker, on specific machinery when working a specific product using a specific technical procedure and the results

cannot be generalized or transferred to other workers with the same disability, similar machines or products. The evaluation method is designed so as to be as objective and detailed as possible with relation to the specific situation. The examiner should keep in mind that in addition to making the activity possible, the goal also includes prevention of undesirable situations, maximum facilitation of work and elimination of any risk of injury. This could also be the next stage of development of the method where the research would be extended to an independent way of ensuring safety during the activity.

The main contribution of this method which deals with the employment of handicapped individuals is a new perspective on utilizing the work of handicapped individuals with the possibility of systematically ascertaining which specific acts the worker has a problem with during machining and of directly confronting the problem. There is currently a tendency not to consider the possibility of employing these people or it is otherwise generally accepted that this is not at all possible.

The experience of some protected workshops have shown that the opposite is true and they support the usage of the proposed method.

## CONCLUSION

The main contribution of the thesis was to propose a method of evaluating the employment possibilities for people with special needs when working with woodworking machines and to be able to provide a true measure of the feasibility of work involving mechanical wood processing by the person with special needs in protected and socio-therapeutic workshops. Four protected wood processing workshops were visited within the framework of the research in order to ascertain the methods they used, the approaches applied by the leaders of the workers and the methods used to employ people with special needs in wood processing. The employees in these organizations currently work mainly with their hands. When machining, their work is enabled by means of special devices and other adaptations which compensate for their handicap.

The proposed method determines the work capacity of a specific person on a specific machine when machining a specific workpiece and its aim is to identify the real causes which prevent people with a special need from performing work. A model of the method has been tested with one handicapped worker.

The originality of the method consists in creating a questionnaire focused on the activity under examination which has been chronologically broken into individual sub-operations for which we have determined the degree of mastery and load rate for each worker. In case of failing to carry out a sub-operation, we have proposed possible measures to remove the barrier to enable the person to carry out the operation. If we succeed in removing the barriers in all the sub-operations, it means that the worker will be able to carry out the activity, alternatively, we try to find out which specific operations they are not able to handle.

The method also results in the actual evaluation and proposals for the conditions or the adaptation of the working environment which will fully compensate for the handicap so that the worker is able to perform the activity.

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