

Petra Kvasnová, Lubomír Žáčok
Matej Bel University, Banská Bystrica

Luboš Kvasna
PPS Group a.s.

ENGINEERING COMPANIES SUPPORT COMBINING STUDENT TEACHING WITH PRACTICE

Engineering companies in Slovakia raise the alarm. The situation with the young generation, which would be interested in the technique, is alarming. Young people are not interested in technical studies, moreover they do not show interest even to increase their qualifications free of charge.

Introduction

Slovakia is an industrialized state and, according to official statistics, there is a lack of skilled labor in the industry in the range of 40,000 employees. It is rather paradoxical that young people have not shown interest in studying technical courses for a long time. Many employers in cooperation with academia have already made own steps focused on the support of the technical studies and on work with the talented students. Based on the request from PPS Group a.s. in Detva¹, for which it is particularly important the will to work and develop skills in the engineering production, a survey of involvement and success rate of free welding course offered for young and new employees was conducted. The course was offered for people who could not get back into the labor market for a longer time or who were interested in qualification change. It was also offered to the pupils after completing primary education as well as graduates of the United Secondary School in Detva². After completing the basic welding course the graduates were given the opportunity to work in the aforementioned PPS Group a.s that was willing to pay for the basic welding course and open the door to the new and young generation.

¹ Materials of PPS Group a.s.

² Cf. E. Baron-Polańczyk, *Multimedialne materiały dydaktyczne w edukacji techniczno-informatycznej w szkole podstawowej i gimnazjum. Raport z badań*, Zielona Góra 2007, passim.

1. Methods

Call for participation in the project offered by PPS Group a.s. to complete the basic welding course was published in the regional newspapers Zvolensko and Lúčenecko as well as on the PPS Group a.s. (www.ppsgroup.sk). It was the basic welding course according to STN 05 0705, welding non-alloy and low-alloy steel with the characteristics listed in table 1³.

Table 1. Class classification of non-alloy and low-alloy steel

Steel class	Steel according		Steel characteristics
	use	alloy grade	
10	construction	non-alloy	Required values of mechanical properties, chemical composition is not determined
11			Required values of mechanical properties and Contents of C, P, S
12			Required contents of C, Mn, Si, P, S
13		low-alloy	Alloying elements: Mn, Si, Mn-Si, Mn-V
14			Alloying elements: Cr, Cr-Al, Cr-Mn, Cr-Si, Cr-Mn-Si
15			Alloying elements: Mo, Mn-Mo, Cr-Mo, Cr-V, Cr-W, Mn-Cr-V, Cr-Mo-V, Cr-Si-Mo-V, Cr-Mo-V-W

Applicants learned to weld in the protective atmosphere with the melting electrode (Z-M1). It was a method of the fusion welding, where the welding surfaces of the basic materials are locally melted and by melting of the additional material (melting electrode), the weld bath is created that solidifies and so required physical binding is prepared for the material to be bond. Heat source of the MIG / MAG welding is the electric arc that fuses between the end of the melting electrode and the base material in the shielding gas (figure 1)⁴.

³ Turňa M., Ondruška J., Sahul M., Turňová Z, *Proposal of welding technology for trimetal production. In Annals of DAAAM and Proceedings of DAAAM Symposium*, 2011, p. 0835–0836; Sejč P., Kubiček R., *Analysis of arc stability MIG brazing of 304L stainless steel using solid and flux-cored wire*, "Manufacturing technology" 2015, vol. 15, no. 1, p. 86–92.

⁴ Novák D., Pavlovkin J., Wolf J., Novák V., *Optimization of vehicles' trajectories by means of interpolation and approximation methods*, "Agronomy Research. Tartu: Estonian University of Life Sciences" 2016, vol. 14, no. 3, p. 862–872.

Average age of the participants was 32 years, the oldest member was 53 years old man from Víglaš with completed secondary vocational education at a secondary school abroad. The youngest, 19 years old participant, was from Detva and had primary education.

Table 3. Age distribution of the registered participants

	Years					
	19–25	26–30	31–35	36–40	41–45	46 and more
Number of participants (N)	16	5	11	6	4	5
Percentage (%)	34.04	10.64	23.41	12.76	8.51	10.64

The completed education of the participants was sorted out from the filled applications. 12.77% of the participants had completed a university degree with the title Ing. at the foreign university, bachelor study was completed by one participant (2.13%) at TU in Zvolen, 74.47% (35 participants) had completed secondary vocational education, of which up to 76.92% (20 participants) attended a foreign secondary school. 10.64% completed primary education in Slovakia. Based on the above, we found that 55.32% of the total registered participants were not citizens of the Slovak Republic, and after the subsequent discussion we found out that they came from Ukraine.

Table 4. Completed education of the registered participants

Education/participants	Completed education			
	University degree	Bachelor degree	Secondary vocational	Primary
Number of participants (N)	6	1	35	5
Percentage (%)	12.76	2.13	74.47	10.64

After having completed the course, all participants used the possibility to work for the company PPS Group a.s. After signing the work contract with the company PPS Group a.s. and completing the welding course, the successful candidates entered the Adaptation center PPS. In the adaptation center there is a training on the welding working places and on the specific types of the machines that welders use in PPS Group a.s. The adaptation center admits, in addition to the basic course participants, candidates who are interested in work but have qualifications or skills that are insufficient for the direct production process, however have perspectives to grow professionally. The adaptation process takes place according to the individual skills and competencies of the employees, firstly in the Adaptation Center and later on in the workplace supervised by the professional guarantors.

Conclusion

Employers from industrial plants, not only in Slovakia but also in other countries, raise the alarm and look for attractive ways to change the current situation and encourage young people to attract them into studying technical subjects⁵.

The objective of the PPS Group a.s. project was to increase the employability of pupils of secondary vocational schools in Slovakia or students of technically oriented universities in Slovakia, gradually build and maintain wide potential of qualified staff – specialists, as well as to ensure and deepen their professional growth. PPS Group a.s. offers to pupils and students practical experience directly in the production. Students have their guarantor of professional practice who ensures their professional development in accordance with the instructions of the school. This offer from PPS Group a.s. was highly privileged when considering a free-of-charge welding course and after the successful completion, each participant got the opportunity to work in this successful company and apply the knowledge and skills for a reasonable financial reward.

It is obvious from the results of the survey that young people do not have a great interest in manual work, they see their career rather “behind the table” and best in the management of the companies and do not consider that such a job has to be deserved and the best leader is the one who exactly knows what and how to do – and it only can be learned when he/she tries it out.

What are the possibilities to improve the education of professionals in schools in connection with the practice? One of the solutions is the direct funding of pupils and students from private companies, thus ensuring the direct education. The second option is the direct funding of the research and the need for greater support, changes in the support of proper government. It is important to increase the interest in studying technical directions already at elementary schools, in a motivating and funny way. Consequently, the continuation of the deepening of the interest in the secondary schools and thus the increase of the number of students should be considered as crucial. Only in this way it can be ensured that anyone who graduates from the technical school will work for a living in this field.

The article was elaborated with the support of the project KEGA, No. 019UMB-4/2018 Diversification and strengthening of undergraduate training of future teachers with emphasis on technical education.

⁵ Dostál J., Nuangchalerm P., Stebila J., Bal B, 2016. *Possibilities of inducing pupils inquiry activities during instruction*, [in:] *CSEU 2016: proceedings of the 8th international conference on computer supported education, Rome, April 21–23th*, Portugal 2016, vol. 2, p. 107–111; Očkajová A, *Training and education related to health and safety at work at the Faculty of wood sciences and technology in Zvolen*, Zagreb 2006, vol. 57, no. 2, p. 83–84; Žáčok L., kučerka M., Pavlovkin J., Ďuriš M., *Technika pre 7. ročník základnej školy a 2. ročník gymnázia s osemročným štúdiom*, ed. M. Veselovský, Banská Bystrica 2012, p. 96; Kučerka M., *Výučba a zhodnotenie štátnicových technicky zameraných predmetov na katedre techniky a technológií na FPV UMB v Banskej Bystrici*, [in:] *Technika a vzdelávanie: časopis zameraný na technické vzdelávanie v základných, stredných, i na vysokých školách, na oblasť základného a aplikovaného výskumu, aplikáciu informačných technológií vo výučbe odborných predmetov*, Banská Bystrica 2015, vol. 4, no. 1, p. 79–81.

Bibliography

- Baron-Polańczyk E., *Multimedialne materiały dydaktyczne w edukacji techniczno-informacyjnej w szkole podstawowej i gimnazjum. Raport z badań*, Zielona Góra 2007.
- Dostál J., Nuangchalerm P., Stebila J., Bal B., 2016. *Possibilities of inducing pupils inquiry activities during instruction*, [in:] *CSEDU 2016: proceedings of the 8th international conference on computer supported education, Rome, April 21–23th*, Portugal 2016, vol. 2.
- Kučerka M., *Výučba a zhodnotenie štátnicových technicky zameraných predmetov na katedre techniky a technológií na FPV UMB v Banskej Bystrici*, [in:] *Technika a vzdelávanie: časopis zameraný na technické vzdelávanie v základných, stredných, i na vysokých školách, na oblasť základného a aplikovaného výskumu, aplikáciu informačných technológií vo výučbe odborných predmetov*, Banská Bystrica 2015, vol. 4, no. 1.
- Materials of PPS Group a.s.
- Novák D., Pavlovkin J., Wolf J., Novák V., *Optimization of vehicles' trajectories by means of interpolation and approximation methods*, "Agronomy Research. Tartu: Estonian University of Life Sciences" 2016, vol. 14, no. 3.
- Očkajová A, *Training and education related to health and safety at work at the Faculty of wood sciences and technology in Zvolen*, Zagreb 2006, vol. 57, no. 2.
- Sejč P., Kubíček R., *Analysis of arc stability MIG brazing of 304L stainless steel using solid and flux-cored wire*, "Manufacturing technology" 2015, vol. 15, no. 1.
- Turňa M., Ondruška J., Sahul M., Turňová Z, *Proposal of welding technology for trimetal production. In Annals of DAAAM and Proceedings of DAAAM Symposium*, 2011.
- Žáčok L., kučerka M., Pavlovkin J., Ďuriš M., *Technika pre 7. ročník základnej školy a 2. ročník gymnázia s osemročným štúdiom*, ed. M. Veselovský, Banská Bystrica 2012.

Petra Kvasnová, Lubomír Žáčok, Luboš Kvasna

Firmy inżynieryjne wspierają łączenie nauczania uczniów z praktyką

Firmy inżynieryjne na Słowacji podnoszą alarm. Sytuacja młodego pokolenia, które byłoby zainteresowane tą techniką, jest alarmująca. Młodzi ludzie nie są zainteresowani studiami technicznymi, ponadto nie wykazują chęci nawet podniesienia swoich kwalifikacji za darmo. Na podstawie wniosku od PPS Group a.s. w Detva, dla której szczególnie ważna jest wola pracy i rozwijania umiejętności w zakresie produkcji maszynowej, przeprowadzono ankietę na temat zaangażowania i skuteczności wolnego kursu spawalniczego oferowanego młodym i nowym pracownikom. Kurs oferowano osobom, które nie mogły wrócić na rynek pracy przez dłuższy czas lub były zainteresowane zmianą kwalifikacji. Proponowano go także uczniom po ukończeniu szkoły podstawowej oraz absolwentom Zjednoczonej Szkoły Średniej w Detva. Po ukończeniu podstawowego kursu spawalniczego absolwenci otrzymali możliwość pracy w wyżej wymienionej Grupie PPS, która była gotowa zapłacić za podstawowy kurs spawania i otworzyć drzwi dla młodego pokolenia.

Słowa kluczowe: technika; uczeń; podstawowy kurs spawania; egzekwowanie.

Engineering companies support combining student teaching with practice

Engineering companies in Slovakia raise the alarm. The situation with the young generation, which would be interested in the technique, is alarming. Young people are not interested in technical studies, moreover they do not show interest even to increase their qualifications free of charge. Based on the request from PPS Group a.s. in Detva, for which it is particularly important the will to work and develop skills in the engineering production, a survey of involvement and success rate of free welding course offered for young and new employees was conducted. The course was offered for people, who could not get back into the labor market for a longer time or who were interested in qualification change. It was also offered to the pupils after completing primary education as well as graduates of the United Secondary School in Detva. After completing the basic welding course, the graduates were given the opportunity to work in the aforementioned PPS Group a.s that was willing to pay for the basic welding course and open the door to the new and young generation.

Słowa kluczowe: technique; pupil; basic welding course; enforcement.

Translated by PPS Group a.s

