

# A METHOD OF DETERMINING THE PROCESS FUNCTION TO THE FLUXSHIELDED ARC WELDING FOR THE PENETRATION OF THE WELDING SEAM $h_p$ BASED ON THE PROCESSING PARAMETERS

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In the paper it is determined a mathematical model for calculating the penetration  $h_p$  depending on: the welding arc voltage  $U_a$ , the welding current strength  $I_s$ , the rate of welding  $v_s$  and the feed rate of electrode  $v_e$ .  $h_p = f(U_a, I_s, v_s, v_e)$

The researches goal was to obtain a process function for the technological parameters of dismantled assemble process through automatic electrical welding using flux layers. The experimental researches have been done on a reduced octagonal plan ( $2^{4-1}$ ) [HEU 00].

For the measurement units avoidance, there has been made a procedure to establish levels and parameters codes of control  $FC = \{U_a, I_s, v_s, v_e\}$ , as well as noise factors  $FZ = \{U_a I_s, U_a v_s, I_s v_s\}$ . See tabel 1.

TABEL 1		LEVELS	
Independent variables (explanatory)	COD	-1	+1
<i>NORMAL MEASUREMENT</i>			
Spring tension $U_a$ , [V]	$U_a$	28	38
The intensity of the welding electric current $I_s$ , [A]	$I_s$	500	650
The welding speed $v_s$ , [cm/min]	$V_s$	112	168
The electrode advancing speed $v_e$ , [cm/min]	$V_e$	120	160

Following the expermental data, there have been obtained the mathematic equation model:

$$h_p = 7,1875 + 0,7275 \cdot \frac{U_a - 33}{5} + 0,1925 \cdot \frac{I_s - 575}{75} + 0,1125 \cdot \frac{v_s - 140}{28} + 0,3575 \cdot \frac{v_e - 140}{20} +$$

$$+ 0,543 \left( \frac{U_a - 33}{5} \cdot \frac{I_s - 575}{75} + \frac{v_s - 140}{28} \cdot \frac{v_e - 140}{20} \right) + 0,1925 \left( \frac{U_a - 33}{5} \cdot \frac{v_s - 140}{28} + \frac{I_s - 575}{75} \cdot \frac{v_e - 140}{20} \right)$$

$$- 0,833 \left( \frac{I_s - 575}{75} \cdot \frac{v_s - 140}{28} + \frac{U_a - 33}{5} \cdot \frac{v_e - 140}{20} \right)$$

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