DIFFERENCE IN MOTORIZED POSSESSIONS OF CABLE OWING TO DIFFERENCE OF RAPIDITY IN CABLE SKETCH PROCEDURE

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Abstract:

Wire rod 5.50mm from steel grade 0.51% carbon and 0.65% carbon were drawn to 1.35mm in 13 draws and two speeds 10m/sec and 30m/sec. The increase of speed from 10m/sec to 25m/sec caused the increase of tensile strength about 4-5%. 2. Higher speed decreases the number of twists observed 3. The increase in speed causes to reduce number of bends by 8-10%.and also as the carbon percentage increase the number of bends goes on decreasing.

Index Terms – Wire drawing, drawing temperature, tensile strength, drawing speed

INTRODUCTION

In the wire drawing process, the cross section is reduced by the pulling it through a tungsten carbide die which is inserted in the die box and the wire is pulled by cylindrical drum which is driven by electric motor [1].

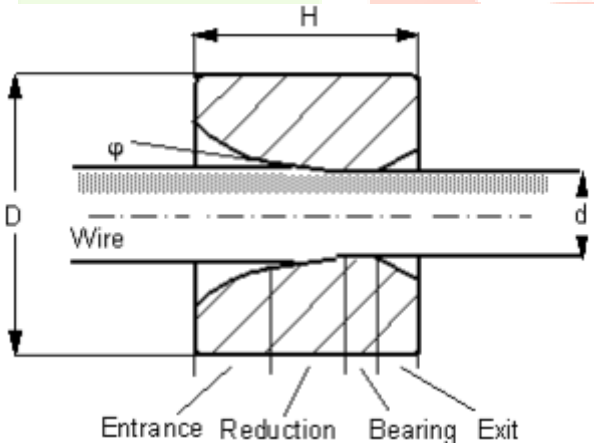

Fig. Principle of wire drawing

However, in practical, technical and economical advantages with a faster speed are remarkable higher than during drawing with maximum reductions because a higher drawing speed increases the production yield for a specific drawing machine. There has been a trend in wire manufacturing to using.

Experimental procedure

Composition by weight in %								
C	Mn	Si	P	S	Cu	Ni	Mo	Sn
0.51	1.25	0.70	0.01	0.07	0.022	0.01	0.005	0.004
0.65	1.22	0.60	0.015	0.08	0.021	0.01	0.005	0.004

In order to estimate the influence of drawing speed on mechanical properties of wires with TRIP effect, described relation between tensile strength Ts, Temperature T in 0 c uniform elongation.

Table : Schedule of draws and mean values of mechanical and technological properties of wires of steel C51. Draw speed 30m/s. and 10m/s.

V=25m/s C 51									
L_P	φ	A_P	A_t	T_s	T	E_l	C_t	N_b	N_t
	(mm)	(%)	(%)	(MPa)	^0C	(%)	(%)		
1.	5.50	0.0	-	793	-	8.7	43	14	13
2.	4.91	20	20	872	99	2.6	21	13	14
3.	1.80	20	89.29	1626	239	1.8	53.4	13	28
4.	1.63	20	91.22	1705	250	1..4	52.6	11	30
5.	1.49	20	92.68	1783	261	1.6	51	11	32
6.	1.35	20	93.98	1852	274	1.7	48	10	34

RESEARCH RESULTS: WIRE PROPERTIES

The wire rod were examined at Tata steel plant for the following properties: tensile strength (Ts) in MPa, total elongation (El) in %, contraction (Ct), number of twists Nt, Number of bends Nb. The mean values in the table were calculated for the mechanical properties of the 1.35mm wire drawn from the 5.5mm wire rod (steel C 51) at two draw speeds (10m/s and 25m/s). Table shows the same values for the wire drawn from the 5.5mm wire rod (C-65) at draw speeds (10m/s to 25m/s). The following parameters were calculated for each draw: average temperature on the cross section of the wire (T), wire surface temperature (Tt). Table shows the value of calculated parameters for all draws with a speed 10m/s for steel C51 at a speed of 25m/s. Table shows the value of A, At, Ts, T, Nb, Nt for all draws for steel C65 at a speed of 10m/s and 25m/s in the final. The wire surface was observed with an optical microscope at the magnification of 400x.

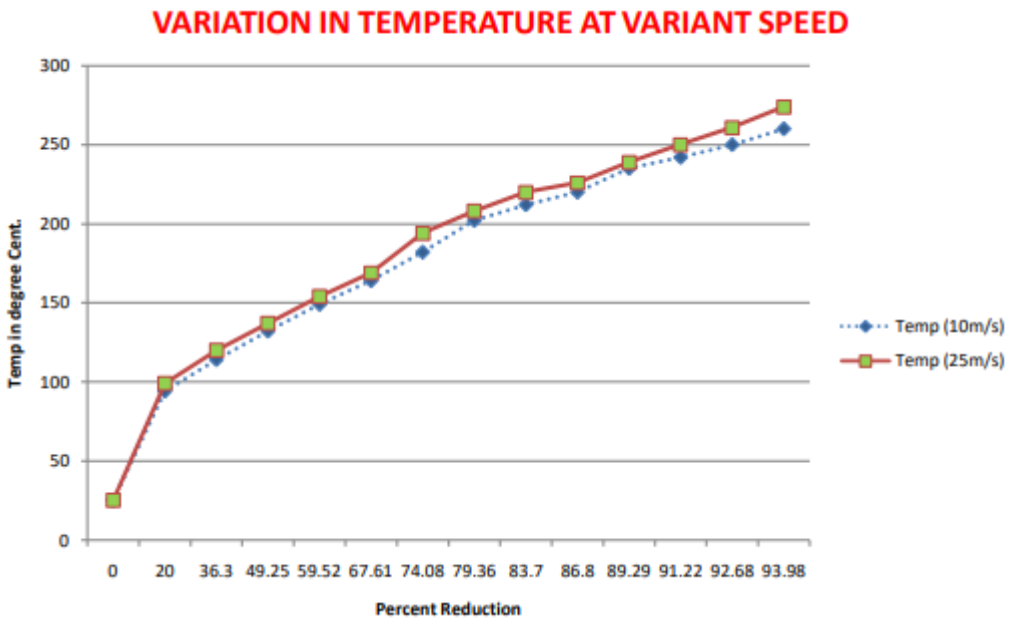

Fig : Variation in mechanical properties due to speed in cold wire

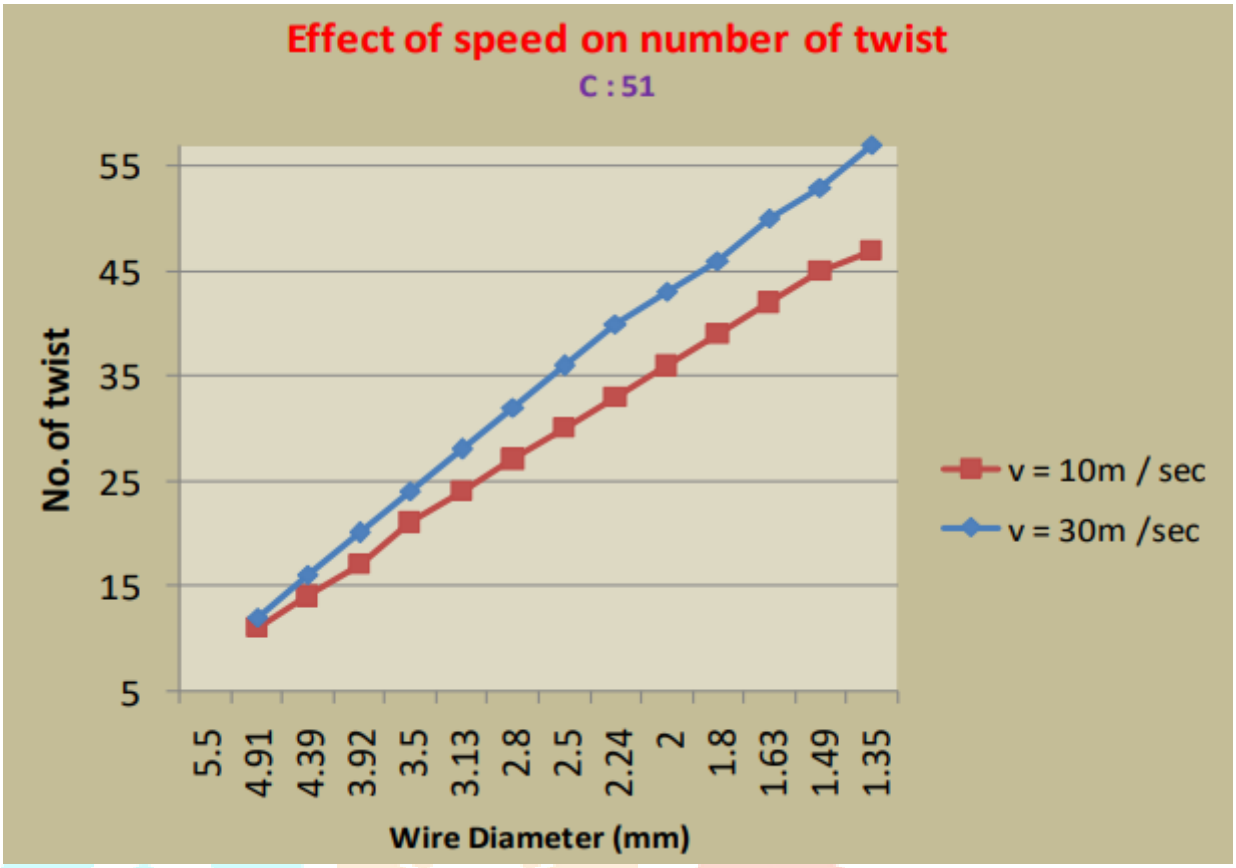

Fig : Effect of speed on number of twist

On the basis of preliminary analysis of data from tables and others, it has been decided that process parameters and mechanical properties of tested wires will be estimated for all initial draws, three final draws and last one. This will be helpful in precisely estimating the effect of the draw speed on the above mentioned features of the process and wires, it can be stated that value of draw stress component in the initial group of draws are independent.

Regarding the effect of draw speed on temperature of a wire surface, Table show that it is similar at a slow draw speed, 10m/s, for all three groups of analyzed draws for steel C51. The result, respectively are: draws (1-10) 100 - 1400C, draws (11-12) 240 - 2500C and for last draw, 255- 2600C. Drawing at a speed of 30m/s for this same steel, the comparative surface temperatures are : draws (1-10) 100 - 2400C,draw (11-12) 260 - 2650C and for last draw 274 - 2760C.

10m/s the temperature goes on increasing as the carbon percentage increase for draw (1-10) the temperature rise is 10-130 c for draw (11-12) temperature rise is 4-8 0 c for last draw the temperature rise is 40 c. For a speed of 30m/sec for the considered group of draw the temperature rise for draw (1-10) is 150 c, for draw (11-12) temperature rise is 3-4 0 c, for last draw temperature rise is 20 c. Regarding the effect of drawing speed on number of bends, Table shows that the number of bends for draw (1-10) having same value, for draw (11-12) the number of bend decrease by 1, for last draw the number of bend decreased by 1.But as the carbon percentage increases from C51 to C65 the number of bends decreased by 1.

Conclusions

1. The increase of speed from 10m/sec to 25m/sec caused the increase of tensile strength about 4-5%. 2. Higher speed decreases the number of twists observed 3. The increase in speed causes to reduce number of bends by 8-10%.and also as the carbon percentage increase the number of bends goes on decreasing. 4. The increase of speed causes rise in temperature, which is required to reduce to avoid strain hardening and wire breakage. 5. At higher speed it is observed that the surface of the wire is smoother than at lower sped.

References

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