ISSUES CONCERNING PERFORMANCE OF PRESSING PROCESSING TOOLS IN BIMETAL VERSION

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Abstract: *This paper describes the problems that arise and how to solve them, the reconditioning process by pressing, made of alloy steels.*

Currently two situations which are common to the degradation of deposited layers in the race for reconditioning parts mentioned above, namely:

- *Creating the recovery in the base material of white spots (soft), which causes fatigue cracks in that area that causes the separation of material deposited on the supports.*
- *Creation of interface defects frequently in tools made of iron loaded with cutting edges by welding used in the automotive industry.*

In the second part of the paper are some examples of practical applications.

Key words: *bimetal,*

1. GENERAL

Manufacture of tools for processing by hot pressing or cold, in the version obtained by loading bimetal welding is a process commonly used in the current period.

One of the major advantages of the reconditioning process is easily degraded mining tools at the cutting edge of active areas or, in some cases mounted on press tools [1].

Due to the severe conditions of application, frequently in severe abrasion wear of metal on metal type combined with thermomechanical fatigue [2], anti-wear layers are composed of complex alloy steels and micro [3].

Deposits are made in many cases by power manual processes, or WIG electrodes coated with the hollow rods or cast tool steels.

Chemical composition of base materials [4], are shown in Tables 1 and 2.

Table 1. Tool steels for cold

Line No	Mark	Chemical Composition% by mass									
		C	Si	Mn	P	S	Cr	Mo	Ni	V	W
1	90VMn20	0,8 0,95	0,1 0,4	1,8 2,2	0,03	0,03	≤0,35	-	≤0,35	0,05 0,2	-

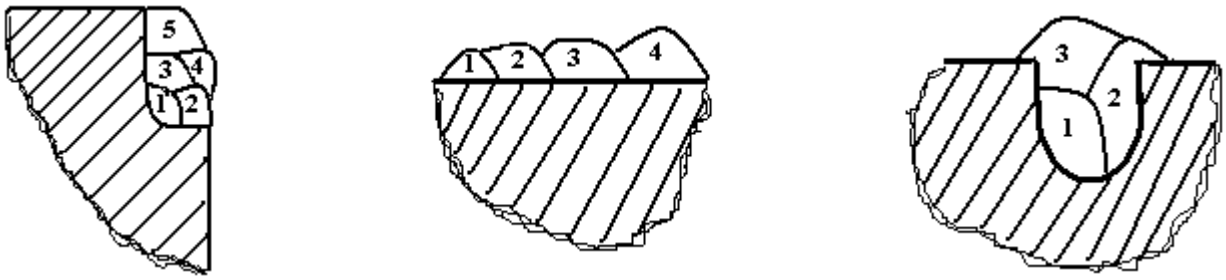
2	105MnCrW11	1 1,1	0,1 0,4	0,8 1,1			0,9 1,1	-	≤0,35	-	1 1,3
3	117VCr6	1 1,25	0,15 0,3	0,2 0,4			0,5 0,8	-	≤0,35	0,07 0,12	-
4	100VMoCr52	0,9 1,05	0,1 0,4	0,5 0,8			4,8 5,5	0,9 1,3	-	0,15 0,35	-
5	165VWMoCr115	1,55 1,75	0,25 0,4	0,2 0,4			11 12	0,5 0,7	≤0,35	0,1 0,5	0,4 0,6
6	155MoVCr115	1,5 1,6	0,1 0,4	0,15 0,45			11 12	0,6 0,8	≤0,35	-	-
7	205Cr115	1,9 2,2	0,1 0,4	0,15 0,45			11 12	-	≤0,35	-	-
8	90VCrMn20	0,85 0,95	0,1 0,4	1,9 2,1			0,2 0,5	-	≤0,35	0,05 0,15	-
9	105CrW20	1 1,1	0,15 0,35	0,15 0,40			0,6 0,9	-	≤0,35	-	1,8 2,2

Table 2. Tool steels for hot working

Line No	Mark	Chemical Composition% by mass									
		C	Si	Mn	P	S	Cr	Mo	Ni	V	W
1	31VMoCr29	0,28 0,35	0,10 0,40	0,15 0,45	0,03	0,03	2,7 3,2	2,6 3	≤0,35	0,4 0,7	-
2	36VSiWMoCr53	0,32 0,40	0,9 1,2	0,3 0,6			5 5,6	1,3 1,6	≤0,35	0,15 0,40	1,2 1,4
3	39VSiMoCr52	0,36 0,42	0,9 1,2	0,3 0,5			4,8 5,5	1,1 1,4	≤0,35	0,25 0,50	-
4	40VSiMoCr52	0,37 0,43	0,9 1,2	0,3 0,5			4,8 5,5	1,2 1,5	≤0,35	0,9 1,1	-
5	55MoCrNi16	0,5 0,6	0,1 0,4	0,5 0,8			0,5 0,8	0,15 0,30	1,4 1,8	-	-
6	55VMoCrNi16	0,5 0,6	0,1 0,4	0,65 0,95			0,6 0,8	0,25 0,35	1,5 1,8	0,07 0,12	-
7	55VMoCrNi17	0,5 0,6	0,1 0,4	0,85 0,95			1 1,2	0,5 0,6	1,6 1,9	0,1 0,2	-
8	57VMoCrNi17	0,52 0,62	0,15 0,35	0,6 0,8			1 1,2	0,5 0,6	1,6 1,9	0,1 0,2	-

9	30VCrW85	0,25 0,35	0,15 0,35	0,2 0,4			2,5 2,8	-	≤0,35	0,3 0,4	8 9

Deposition of anti-wear are geometrically designed according to the purpose pursued in three distinct ways, fig. 1, cutting edge type (1.a.), the active surface type (1.b.), and reinforced the notch type (1.c.).



a). b). c).

Fig 1. Deposits anti-wear

a) - cutting edge type b) - type active area, c) - type in the reinforced notch

Product Brand	Chemical composition in%							
	C	Mn	Si	Cr	W	alte %	Hardness HRC	Application
EI CrW2	0,4-0,6	1,5-2,2	0,8-1,3	0,8-1,2	2,3-3,0	-	58-62	Charging by welding active part of punches made of unalloyed or low alloy steel in hardening their view.
EI Cr5WTT	0,5-0,7	0,9-1,1	0,9-1,1	5-6	1,2-1,5	max.1,5 Ni; 1,3-1,6 Mo; 0,3-0,5 V	55-60	Loading active parts subject to wear and abrasive load of earthmoving equipment wear layer on the parts of manganese steel.
EI Cr2.5W4.5V	0,2-0,5	-	1,0-1,5	2,0-3,0	3,5-5,5	max.1,5 Ni; max. 1,0 Mo; 0,4-1,0 V	pe stratul 3, in stare sudata: min. 45	Loading and reconditioning of dies for forging and hot pressing
EI Cr17W4	0.7	1.2	0.7	17	4	Fe	35-40	Load and reconditioning process by hot pressing at temperatures up to 650 ° C

2. Loading welding materials

Areas of use and physicochemical characteristics of the materials in current production [5] are shown in Table 3.

Table 3. Areas of use and physicochemical characteristics of the materials in current production

3. SPECIFIC ISSUES

The reconditioning process tool for processing by hot pressing or cold are two situations to be solved, namely:

- Creating the recovery in the base material of white spots (soft), which causes fatigue cracks in that area that causes the separation of material deposited on the supports. As a solution to eliminate the disadvantage mentioned above are used for applications using buffer layer (intermediate) of austenitic stainless steels with high resistance electrodes, made by alloying with tungsten or to make deposits with a thickness large enough so that maximum stresses caused by contact repeated tools with workpieces to be deposited in the layer.
- Creation of interface defects frequently in tools made of iron loaded with cutting edges by welding used in the automotive industry. In order to solve the incompatibility between the material and the deposited materials were developed specialized type of Fe-29% Cr-9% Ni.

Physico-chemical characteristics of newly developed materials are shown in Table 4.

Table 4. Physico-chemical characteristics of newly developed materials

Hallmark	**Indication**	**Weld metal chemical composition in%**						
		C	**Mn**	**Si**	**Cr**	**Ni**	**W**	**Others**
18.9MnW2	Prescribed	0,04-0,14	3,0-3,5	1,2	18,0-11,0	9,0-11,0	-	-
18/8/6W2	Determined	0,12	5,8	0,70	18,5	9,1	2,5	Ti 0,1
E 29/9	Prescribed	0,12-0,18	1,5-2,5	0,3-0,7	28,5-30,5	8,5-9,5	-	Fe
E 29/9	Determined	0,15	1,9	0,4	29,1	9,2	-	Rest

4. CONCLUSIONS

In order to reconditioning by welding tool for processing by hot pressing or cold were similar in manufacturing a wide range of materials for welding, which largely covers industrial needs.

5. REFERENCES

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