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Files

March 2, 1951

H. F. Reichard

SWAGING TEST OF duPONT SIZE BARS AT THE TORRINGTON COMPANY

SYMBOL: PO:HFR:vj

RESEARCH & DEVELOPMENT (GEN.)

On February 23, 1951 the subject test was run reducing three 3-foot 13/16"-D pickled uranium alpha rolled rods to 3/4"-D at room temperature with a 5-HP (Torrington size 4) swager and two piece die.

Contacted were Messrs. Clark, Heppelman, Morgan, Mayhew of Torrington.

Dimensions and Rockwell hardness of the bars before and after reduction are tabulated on the attached chart, together with the dimensions after cold straightening at Wyckoff Steel Company. Hardness readings were taken on a hand filed flat at the center of the bar in each case.

All the bars were hand fed. No. 3,492 was passed straight through and measured 12 mils oversize. The dies were redressed and after the second pass the bars appeared, with rough measurement, to be O.K. The other two were then passed $\frac{1}{2}$ way through, turned and the other $\frac{1}{2}$ swaged. The machine labored and seemed to approach a stall at several points.

Conclusions drawn by Torrington personnel and the writer:

1. We need a die with a blade no longer than that used in the test. (about 3" die length $\frac{1}{2}$ blade.)

2. We should do our job in two steps, a large reduction followed by a very small one.

3. We can probably swage this size rod at five feet per minute.

4. We will probably consume one pair ($20) of die hammers (backers) per three shifts.

5. The Torrington No. 4 machine with 5-HP motor would not be quite large enough to do the job of this test in sustained production.

6. Swaging will not change the degree of straightness present in the original bars (apparently we could pre-straighten and the bars would remain O.K. which we apparently cannot do with drawing).

7. Except for a few inches in from both ends of a bar, the maximum diameter spread on the second and third bars processed was about plus or minus 1.5 to 2.0 mils.

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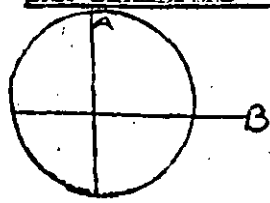
8. Although the bars heated up to over 200°F (by rough test) during swaging, cold working took place as evidenced by the hardness increase.

9. Some working throughout the bar cross-section took place as indicated by the development of slight convexities on flat-sawed ends.

	15-17	"A" Diameter	0.814
		"A" Diameter	0.811
	17	"B" Diameter	0.817
		"A" Diameter	0.810
		"B" Diameter	0.814
			0.811
		"A" Diameter	
		"B" Diameter	0.749
		"A" Diameter	0.750
		"B" Diameter	0.750
		"A" Diameter	0.739
		"B" Diameter	0.747
			0.747
		"A" Diameter	
		"B" Diameter	0.742
		"A" Diameter	0.742
		"B" Diameter	0.740
		"A" Diameter	0.739
		"B" Diameter	0.747
			0.747

cc: F. C. Stroke

BAR DIAMETERS - BEFORE SWAGING - AFTER SWAGING



	Rockwell C Hardness		0"	1"
Before Swage				
#3494	19	"A" Diameters	0.814	0.8
		"B" Diameters	0.811	0.8
#3492	13-17	"A" Diameters	0.817	0.8
		"B" Diameters	0.810	0.8
#3544	17	"A" Diameters	0.814	0.8
		"B" Diameters	0.811	0.8
After Swage				
#3494	25	"A" Diameters	*0.749	0.7
		"B" Diameters	0.750	0.7
#3492	30	"A" Diameters	0.740	0.7
		"B" Diameters	0.739	0.7
#3544	27½	"A" Diameters	0.747	0.7
		"B" Diameters	0.747	0.7
After Medart Straightening				
#3494	-	"A" Diameters	0.742	0.7
		"B" Diameters	0.742	0.7
#3492	-	"A" Diameters	0.740	0.7
		"B" Diameters	0.739	0.7
#3544	-	"A" Diameters	0.747	0.7
		"B" Diameters	0.747	0.7

* Swaging a
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AFTER STRAIGHTENING

Position Along Bars					
12"	18"	24"	30"	36"	42"
0.817	0.818	0.818	0.812	0.811	-
0.811	0.813	0.823	0.810	0.812	-
0.815	0.815	0.816	0.816	0.813	-
0.810	0.806	0.804	0.808	0.804	-
0.817	0.818	0.818	0.812	0.811	-
0.811	0.813	0.823	0.810	0.812	-
0.753	0.753	0.752	0.752	0.752	*0.749
0.753	0.753	0.753	0.752	0.752	0.749
0.749	0.748	0.748	0.747	0.744	0.750
0.749	0.748	0.748	0.746	0.743	0.744
0.756	0.753	0.754	0.754	0.754	0.753
0.755	0.753	0.753	0.754	0.754	0.752
0.753	0.753	0.753	0.753	0.754	0.745
0.753	0.753	0.752	0.752	0.752	0.742
0.749	0.748	0.748	0.748	0.744	0.749
0.749	0.748	0.747	0.748	0.744	0.746
0.756	0.753	0.753	0.754	0.754	0.742
0.754	0.752	0.752	0.753	0.754	0.741

practiced it produced irregular sections extending for
nches in from both ends of all bars. The irregularities
g are probably responsible, together with incomplete filling
he end of the bar and temperature variations.

SPECIAL REREVIEW
FINAL DETERMINATION
UNCLASSIFIED
By: P. F. Brown
Date: 5-9-84