## KAWASAKI STEEL GIHO Vol.17 (1985) No.3

(Kiyohiko Nohara) (Yutaka Ono)

:

## Synopsis:

The effect to "warm press forming" on the press formability of stainless steel sheets in deep drawing and restriking was studied. The result indicates that the press formability of both austenitic and ferritic steels is markedly improved by the compositional control of materials and the suitable selection of warm press forming conditions. The application of a newly developed heat resisting lubricant which can easily be coated and removed because of being water-soluble is to make industrialization of warm press forming possible. It is noted that the problems of delayed fracture and ridging associated with austenitic and ferritic steels, respectively, during conventional press forming at room temperature can be avoided or reduced by the employment of this press forming technique.

(c)JFE Steel Corporation, 2003

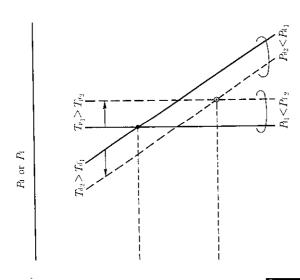
· ·	
Annual Control Control	
para lina ina	
ARRIVE SALE	
Annual Control Control	
Anton Control Control	
<u> </u>	
Warm Press Forming of Stainless Steel Sheets	
Kiyohiko Nohara, Yutaka Ono	
⊞ ⊏	
rando en la companya de la companya	
The state of the s	

Table 1 Tool dimensions

Tool	Material	Size (mm)	$r_{ m p}$ (mm)	$r_{ m d} \  m (mm)$	(mm)	Clearance (mm)	Camber (mm)	Taper on wall
Punch	241M	198.9×268.9	17		50	1.1 (side)	700R	2°

Stainland steel specimens used

·	ステンレス海錙	板の温間プレス成形 	317
	O Drawn through	400	
	O Drawn through Fractured at m	400	
) <del>-</del>			
-			
rar-			
<u>-</u>			
-			
· · · · · · · · · · · · · · · · · · ·	F		
<u></u>			
A <u>l</u>			
· <del>-</del>			
- <u>, , , , , , , , , , , , , , , , , , ,</u>			
A. I			
/			
,			
1 · · · · · · · · · · · · · · · · · · ·			
<i>?</i>			
v			
· -			
· · · · · · · · · · · · · · · · · · ·			
- 4 /-/ / 4 /-/ /			
7			
5.e			
<u> </u>			
12 <u>2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</u>			
C			



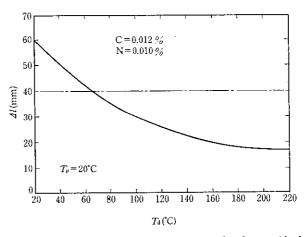
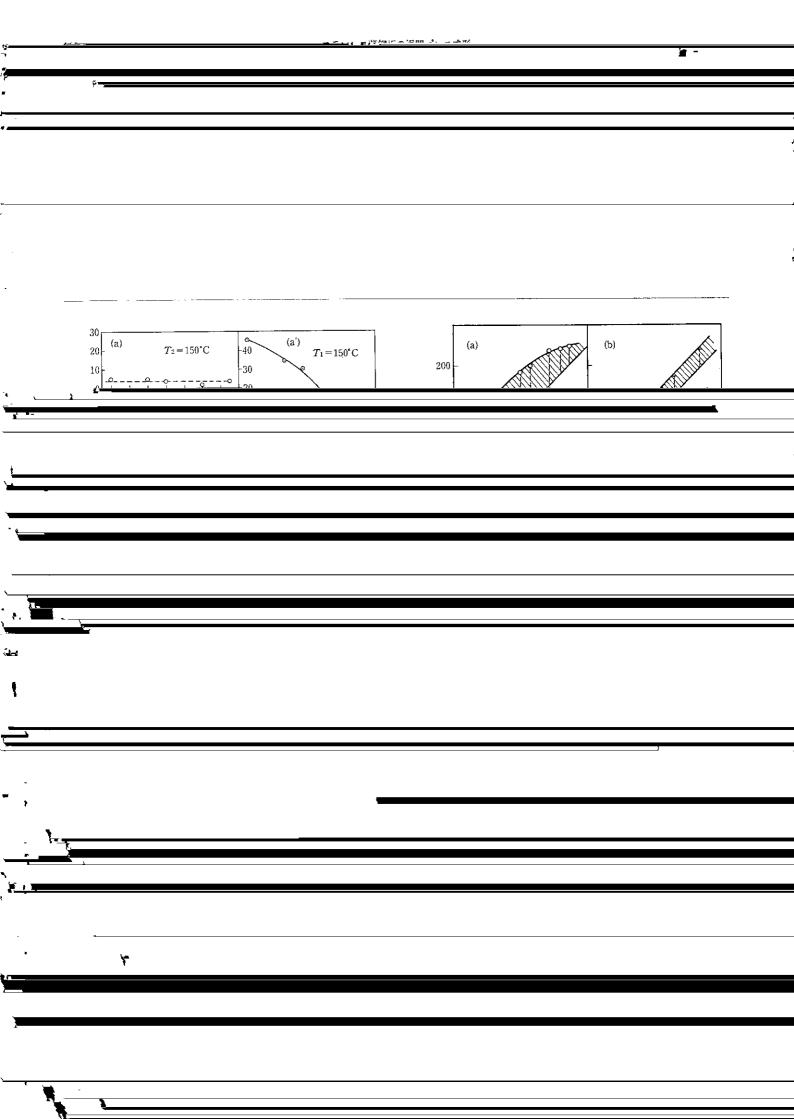
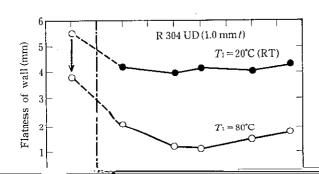


Fig. 10 Change in anisotropic parameter related to residual



	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<u> </u>		process of the second of the second
<u> </u>	Drawbla 91114	(Fracture)	- Charles Comments	* ************************************
	*			
-	<del></del>			
.2				
- 8				
-				
,				
	,			
·->-				
	۷			
-	<i>&amp;</i> -			
, ,	-			
-				
7				
<b>-</b>				
7				
,				
. <del>, ,</del>				
	-			
**				
1.				
-				
•				
-	**			
A				
	Carried St.			
<i>z</i>	**************************************			
··				
de de	<u> </u>			
1 t				
`				
\$	<del></del>			
* -				





**Table 4** Examples of compositions of new water-soluble lubricant with heat resistance

		(wt %)		
Type	A	В	С	
Boric trimethyl	10	10	10	
Machine oil	<u> </u>	5		
Polyethylene glycol		<u> </u>	5	
Methanol/1,1,1 trichloroethane	90	85	85	

drawn

 $T_2$  (°C)

Fig. 17 Influence of drawing temperature  $T_1$  and restriking

果によれば、温間絞りによってリストライク後フランジ曲げ荷重は 大きく低下し、室温加工に比べて最大 25% 程度の荷重減少がもた たされて これは週間が形に ヒーナ事材のフランジ部の加工価化が

義1名こととなる。かお、リストライク温度  $T_2$  による曲げ荷重の

変化は小さかった。

3.3 耐熱性潤滑剤

<u>.                                    </u>	Table 5 Lubricating perf	ormance of newly develope	ed heat resisting lubrica	nt in warm drawing	(mm)	
<u>.</u>	<u> 1                                   </u>					
	,					
1 1						
<u></u>						
<u>.</u>						
•						
<b>)</b>						, _
						1
F						
<b>b</b> . <b>F</b>	•					
1. (a)	<u> </u>					
•···						