Abridged version

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Development of Chance-Free Bulge Roll (CBR) Forming Process for Manufacturing ERW Pipe

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Synopsis :
In response to the increased demand for greater product variety of ERW pipe, Kawasaki Steel Corp. has developed a new forming process for manufacturing ERW pipe named the chance-free bulge roll forming process, that is, CBR forming process & mill. This process is characterized by the new forming flower and new mechanism of the mill, and has been researched and developed using an experimental model mill and a CBR forming pilot mill. On the basis or the results of the above-mentioned efforts the actual CBR mill designed by Kawasaki Steel was installed in June 1990 at Chita Works and has been operating more than satisfactorily. This process has achieved not only high flexibility of forming rolls but also high productivity, excellent formability, and high quality of welded seams and pipe. ERW high-grade, high quality stainless steel pipe has been satisfactorily produced in CBR forming mill.

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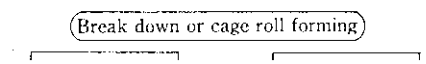
The body can be viewed from the next page.

Development of Chance-Free Bulge Roll (CBR) Forming Process for Manufacturing ERW Pipe*

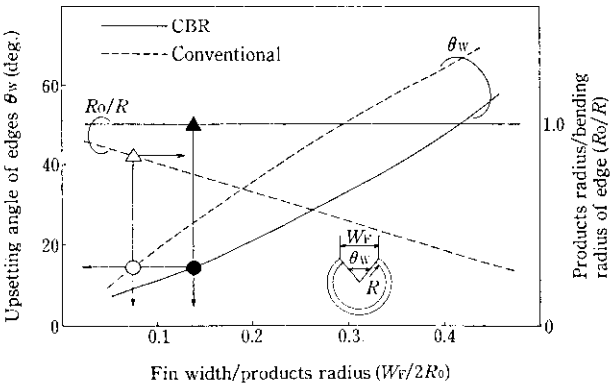
Synopsis:

In response to the increased demand for greater product

lished with the aim of application to a production ERW stainless steel pipe mill were substantially realized. On the basis of these research and development results, a



restrained at portion C, which corresponds to the side



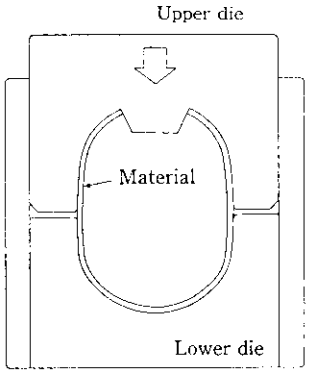


Fig. 6 Press forming simulation of fin pass forming

edges and bending radius of edge

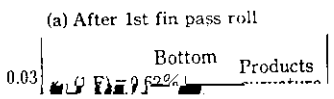
yield and dimensional accuracy of pipe by suppres-

bend-formability of semi-finished pipe in fin pass roll forming were investigated in two-dimensional press

forming processes. At 1F, overbending to a curvature greater than that of the finished product is applied at portion approximately 30 mm and 110 mm from the

Table 1 Dimensions of fin pass roll caliber

	1F	2F	3F
R_1 (mm)	50.00	50.00	50.00


(a) After 1st fin pass roll
0.03
Bottom
Products

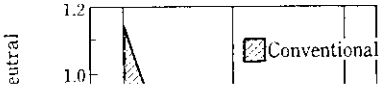

eutral
1.2
1.0
Conventional

Table 2 Comparison of V-convergence angle and opening width of semi-pipe after squeeze roll

V-convergence angle		Opening width of semi-pipe after squeeze roll		
l^*(mm)	θ_V(deg.)	Fin width of 3F, W_{3F}(mm)	After SQ W_E(mm)	Comparative ratio

welded portion.

5 Developmental Experiments Using Pilot Mill

5.1 Experimental Equipment and Method

used for small diameters, and the position of the lower roll is laterally adjustable in accordance with strip width.

Wall-thickness t (mm)

1.0 2.0 3.0

in **Photo 1**, where (a) shows a three-dimensional form-

Tested pipe: 38.1 mmϕ × 1.5 mm/ R 409I

By the development and introduction of the CBR forming mill, not only flexibility of forming roll use but also

ity and pipe features have been obtained, and it has been possible to substantially achieve the original goals.

development efforts.

In conclusion, the authors would like to express their

forming with the model mill given in the course of the model mill experiments by Professor Yoshitomi Onoda