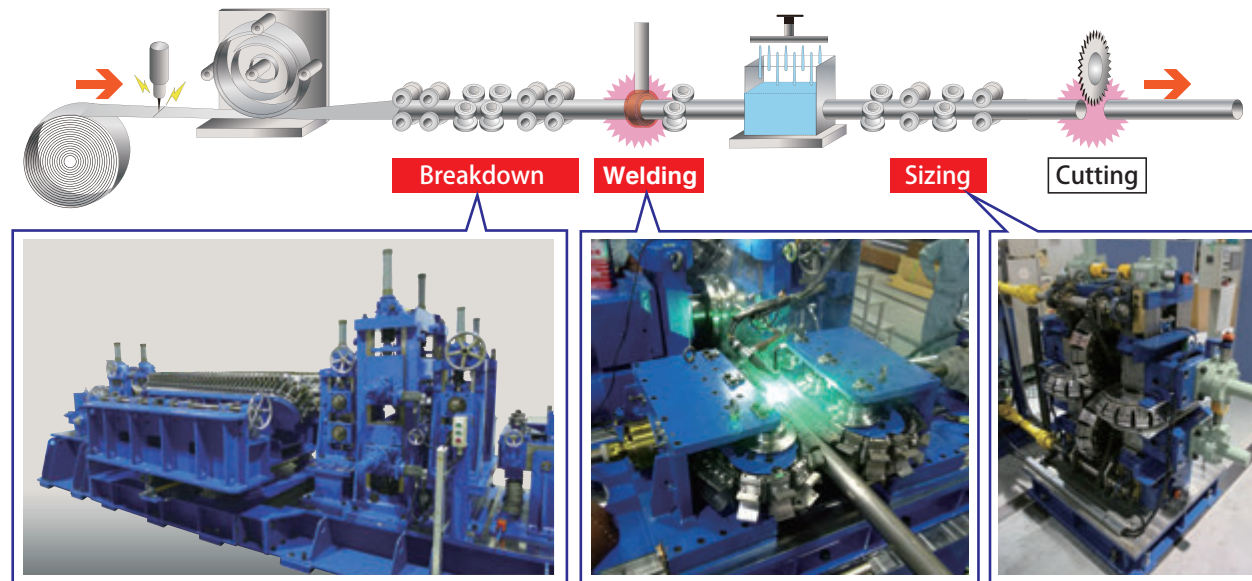


Application of ODF Mill



Experiment results

Excellent forming with wide range of common use even for the challenging materials.

No.	Size	Materials
1	$\phi 45.0 \times 0.4t$	Cu alloy(C1220R-1/2H)
2	$\phi 45.0 \times 3.2t$	Carbon steel(SPHC)
3	$\phi 45.0 \times 4.5t$	Carbon steel(SPHC)
4	$\phi 63.5 \times 0.6t$	Stainless steel(SUS304)
5	$\phi 63.5 \times 0.6t$	Stainless steel(SUS430LX)
6	$\phi 63.5 \times 1.0t$	Mg alloy
7	$\phi 63.5 \times 1.5t$	Carbon steel(SPCC)
8	$\phi 63.5 \times 1.6t$	Al alloy(5052R-H32)
9	$\phi 63.5 \times 3.2t$	Carbon steel(SPHC)
10	$\phi 114.3 \times 0.5t$	Stainless steel(SUS304-2B)
11	$\phi 114.3 \times 0.7t$	Stainless steel(SUS304-2B)
12	$\phi 114.3 \times 3.0t$	Al alloy
13	$\phi 114.3 \times 4.0t$	Al alloy
14	$\phi 63.5 \times 1.0t$	Ti (TP270)

● Small D/t products ($\phi 45 \times 4.5t$, D/t=10)



● Extra large D/t products ($\phi 114.3 \times 0.5t$, D/t=228.6)



● Dry forming for various materials



Features of new forming technology

ODF MILL

— Orbital Die Forming —



ISO9001:2008 Certification

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Φ NAKATA

Features of new forming technology

ODF MILL

— Orbital Die Forming —

Break the limit of roll forming method!

ODF makes use of multiple die blocks moving in the circumferential direction on an endless track, which are connected together to provide a tool surface with a very large curvature radius and work just like a huge roll. The new forming method eliminates the slippage problem between tool surfaces and metal strip and can cover a wide product range from large diameter pipe with excessive thin thickness to small diameter pipe with extra heavy gauge. This ODF method is applicable to each forming stage in the pipe manufacturing.

The development of innovative forming method ODF (Orbital Die Forming)

Using forming rolls with huge diameters can get

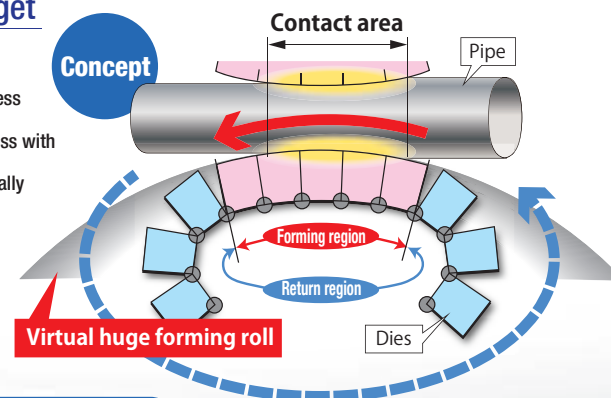


- Forming rolls with huge diameters are used
- Nearly two dimensional forming in section similar to press forming method
- Large contact area with materials \Rightarrow Lower contact stress with less speed difference
- The huge forming rolls for ideal deformation state is really impossible to make.

Only the forming pass of contact zone is necessary to achieve equivalent forming results with huge rolls.

A multiplicity of die blocks is used in place of desirable huge rolls.

In the effective forming area, the dies are seamlessly connected together to provide a continuous tool surface equivalent to a huge roll's, whereas in the other portion of the endless track, the dies are turned as soon as quickly along the nearest path..



The characteristics of ODF method

High workability

In the initial forming stage, the tools can be commonly used to produce various products with different diameters, thicknesses and materials.

Stable forming and high productivity

By using ODF method in the initial forming stage, the strip edge along the whole length is constrained tightly so that the twisting phenomenon can be completely suppressed.

By adopting ODF method in the welding bench, the strip can be constrained over a longer distance and the two edges can be kept squeezed together within this long region., which provide us an opportunity to improve welding speed further than usual roll forming.

Excellent surface quality

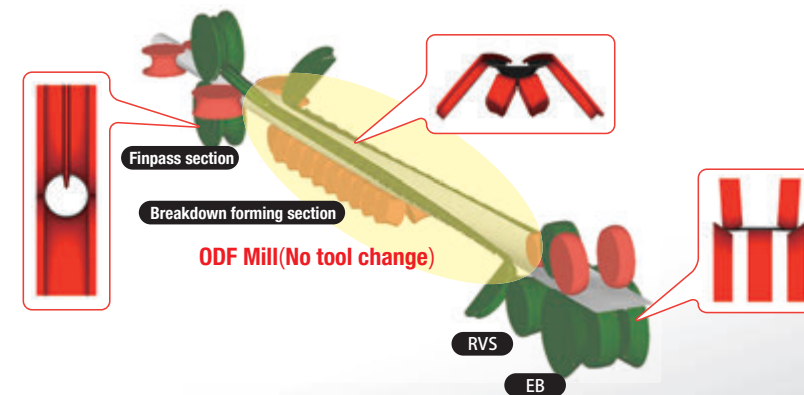
Little slippage between tools and strip surface.

Low work hardening

Nearly 2-dimensional deformation similar to press forming.

By making use of the ODF method in the initial forming stage, the strip can be bent continuously from the flat section to an open round one without any interruption. The elastic recovery which occurs between forming stands of roll forming can be entirely eliminated.

The constitution of ODF mill



Innovative technology