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Control of Strip Buckling and Snaking in Continuous Annealing Furnace

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Synopsis :
The mechanism of buckling and snaking that sometimes occur in a strip traveling through the heating and soaking zones of a continuous annealing furnace was made clear by conducting stress analysis by the finite element method (FEM), a simulation test using aluminum foil and experiments in a commercial-scale continuous annealing line. Measures to prevent strip buckling and snaking were contrived based on the results of these tests. Although the crown of the hearth roll has the function of correcting the snaking of the strip, it gives nonuniform tension to the strip, thereby generating compressive membrane stresses in the strip which comes to buckle. The larger the strip width and the smaller the width of the parallel cylindrical part of the hearth roll, the more the strip will be apt to buckle. to prevent buckling and snaking simultaneously, it is effective to install auxiliary rolls, for example, to near the hearth roll and thereby flatten the profile of the strip.

The body can be viewed from the next page.

Annealing Furnace*

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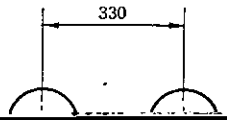
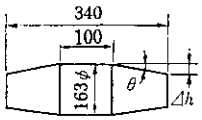
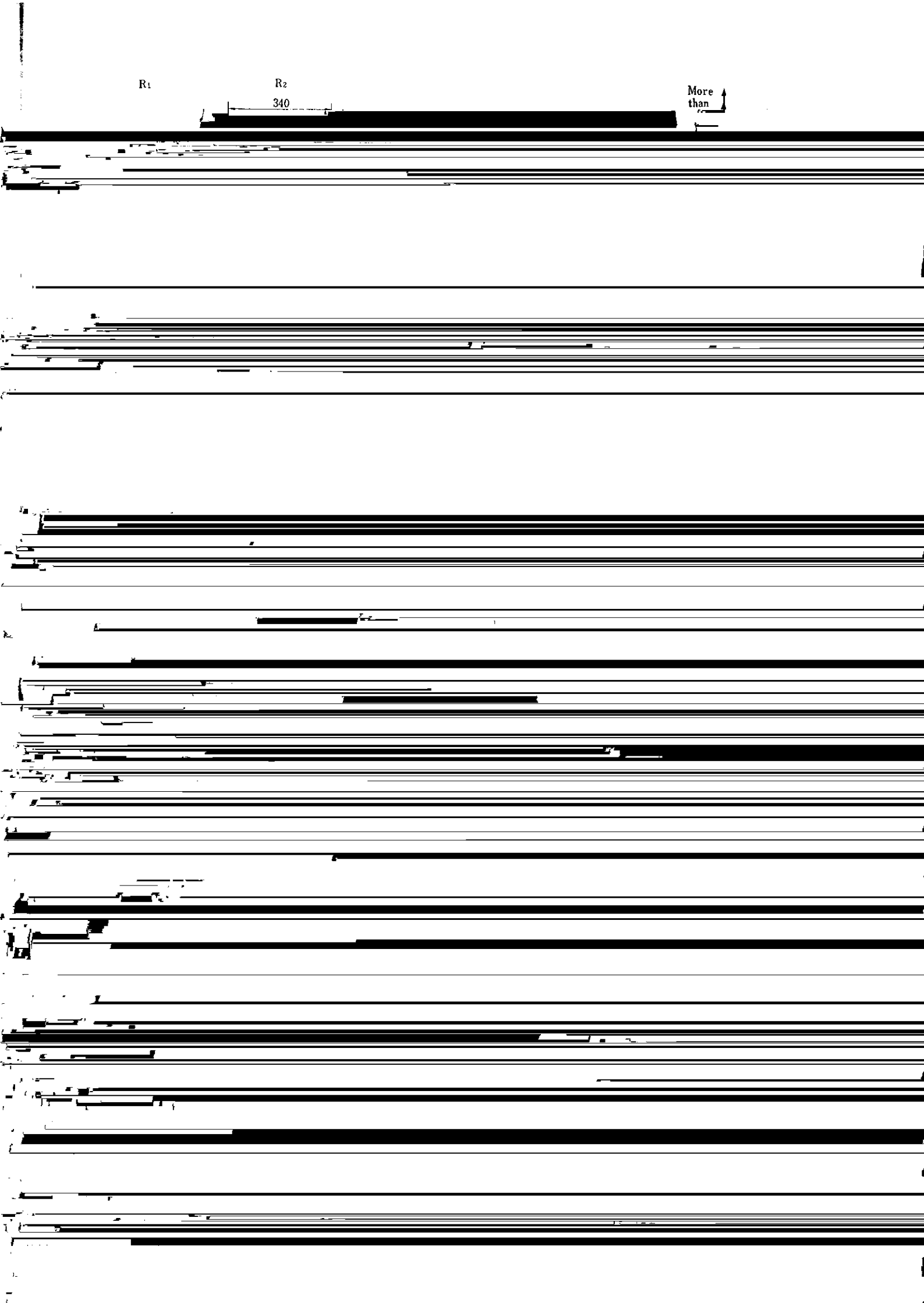


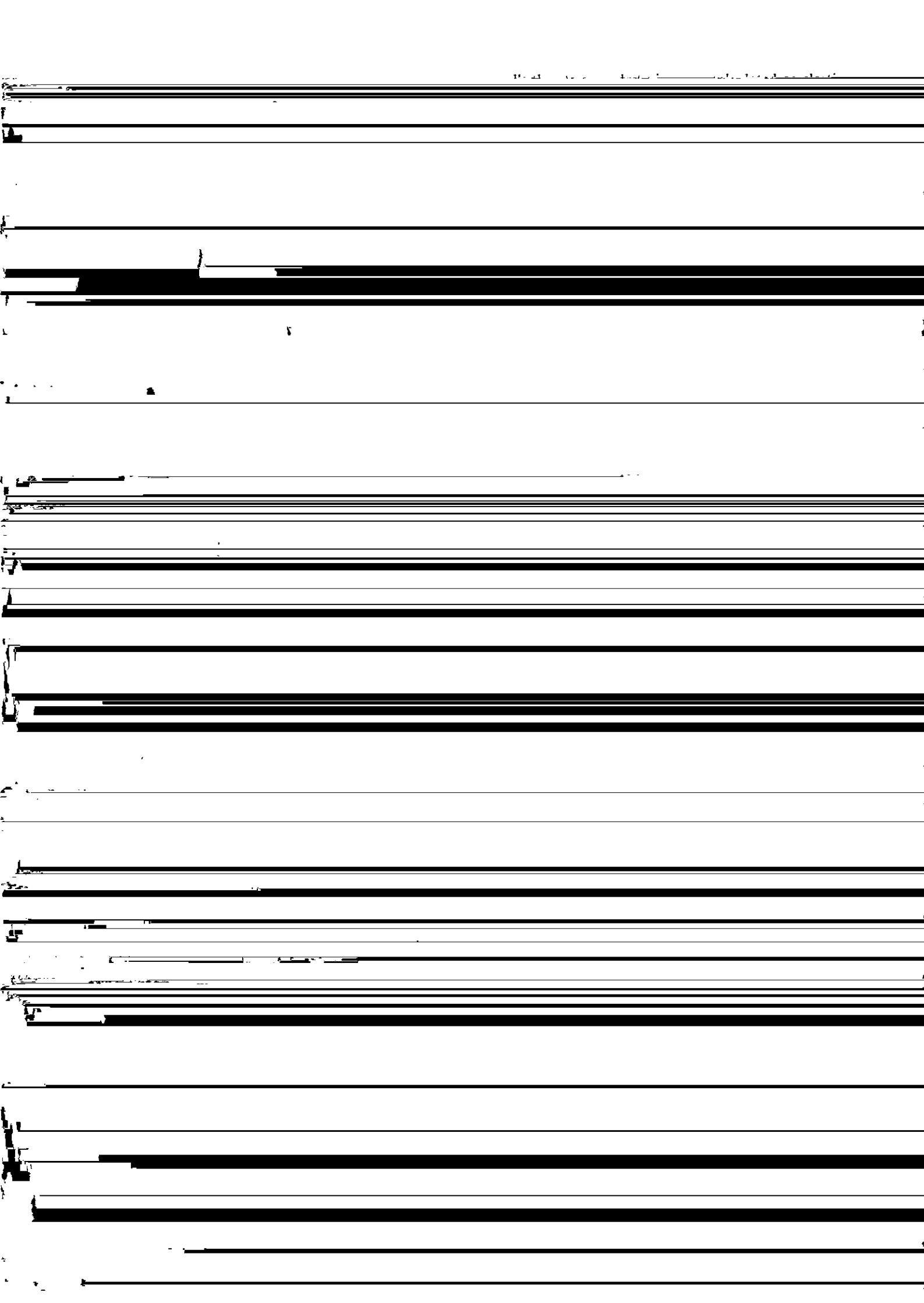
3 Heat Buckling Simulation Using Aluminum Foil

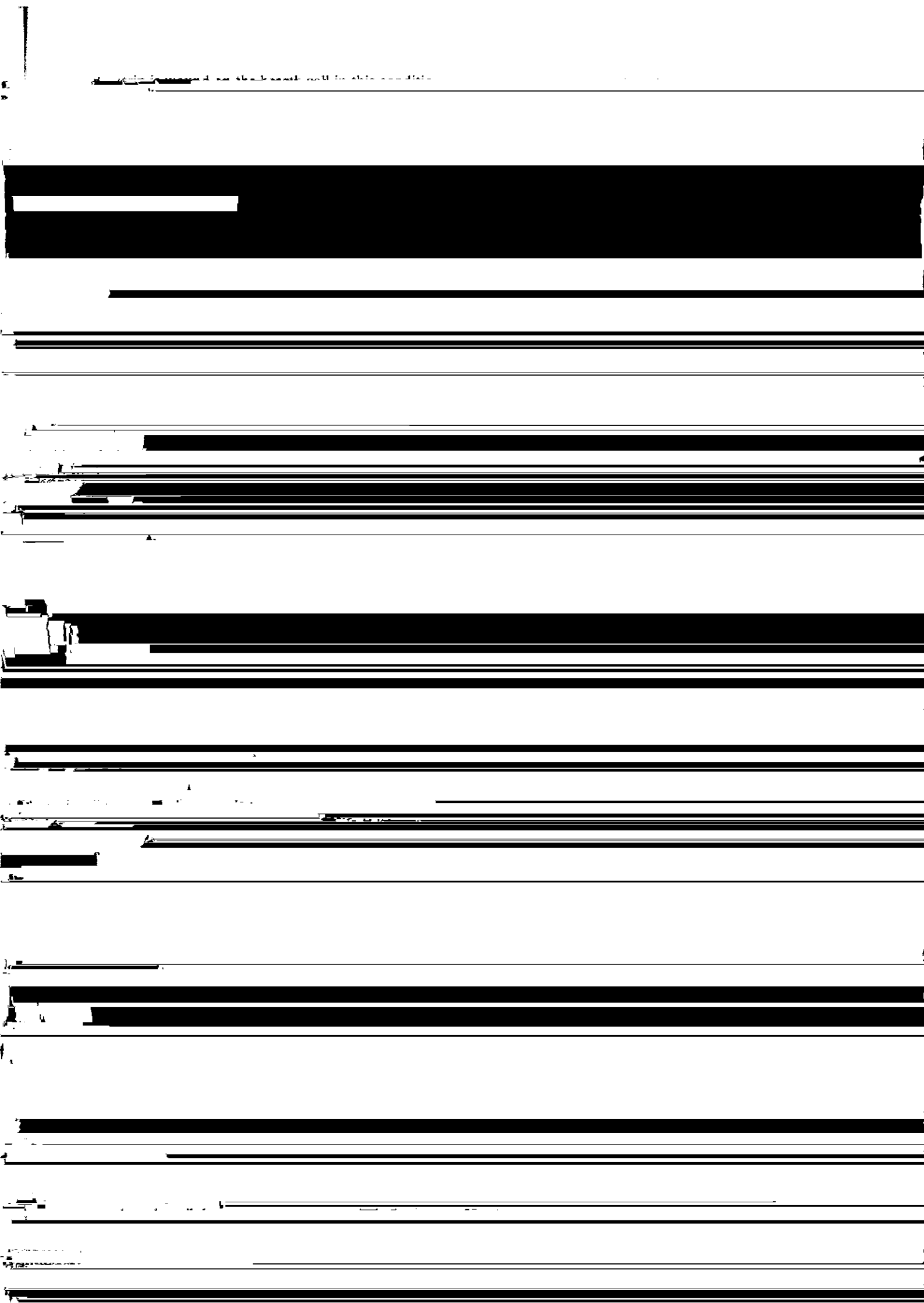
3.1 Type of Heat Buckling



Roll	Buckling	Symbols
Tapered roll	Occurred	●
	Not-occurred	○
Round roll	Occurred	▲
	Not-occurred	△

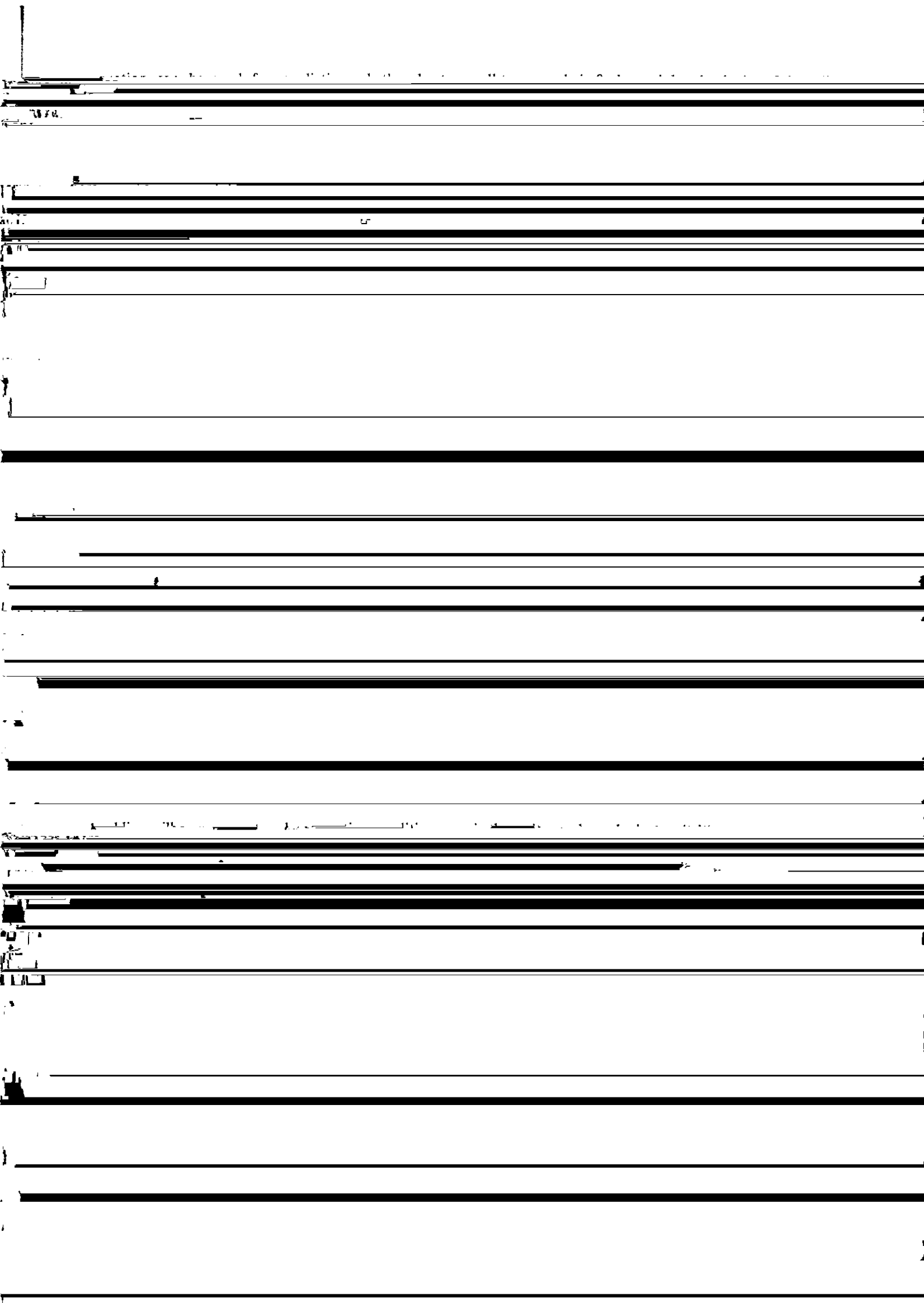

R1
R2
340
More than





$\frac{1}{2}(B-H)$

(a) The larger the $d\bar{\sigma}_2/dT$ obtained by FEM analysis,

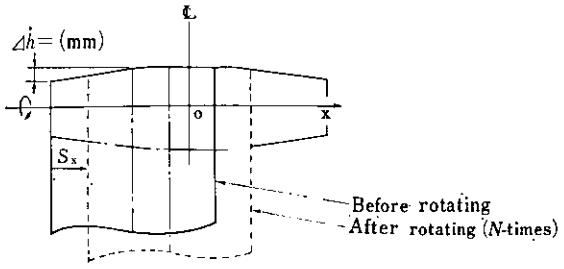


rotation were measured by varying the position where the material is placed. Three types of roll were used

double tapered roll has the worst ability to correct snaking.

for this experiment. Figure 12 shows results of this

Equation (12) expresses the amount of shift of the



(a). Calculated results Tapered roll (b). Experimental

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