METEC & 2ND ESTAD 2015

EUROPEAN STEEL TECHNOLOGY AND APPLICATION DAYS

NSENGI

"NS blade" / Advanced Air Knife for Hot Dip Continuous Galvanizing Line

NS means Nippon steel & Sumikin engineering.

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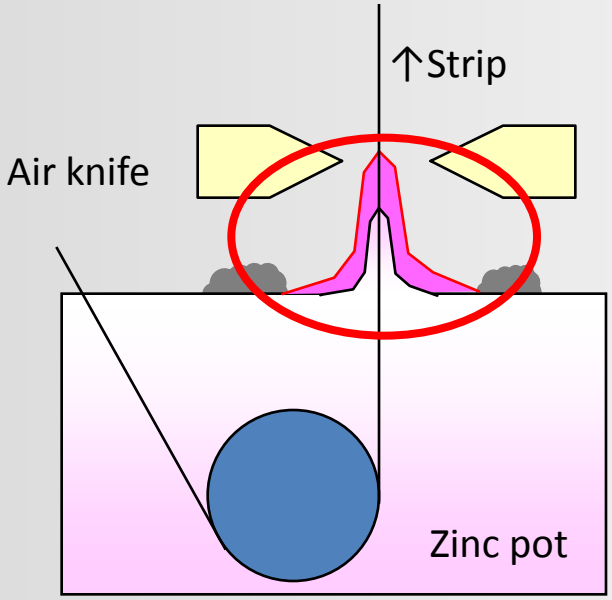
1. Difficulty of High Speed CGL Operation

■ Generation of edge splash and top dross loss in High Speed Operation



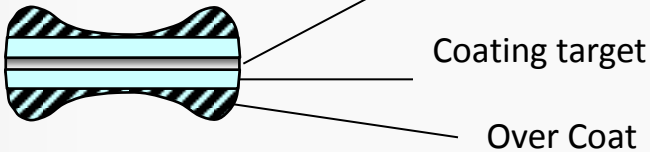
As Line Speed increases,
zinc-takeout pulled by strip increases.

■ Generation of edge splash
leads to the loss of zinc consumption.

① Top dross loss

②Difficulty in thin coating

③Edge over coat

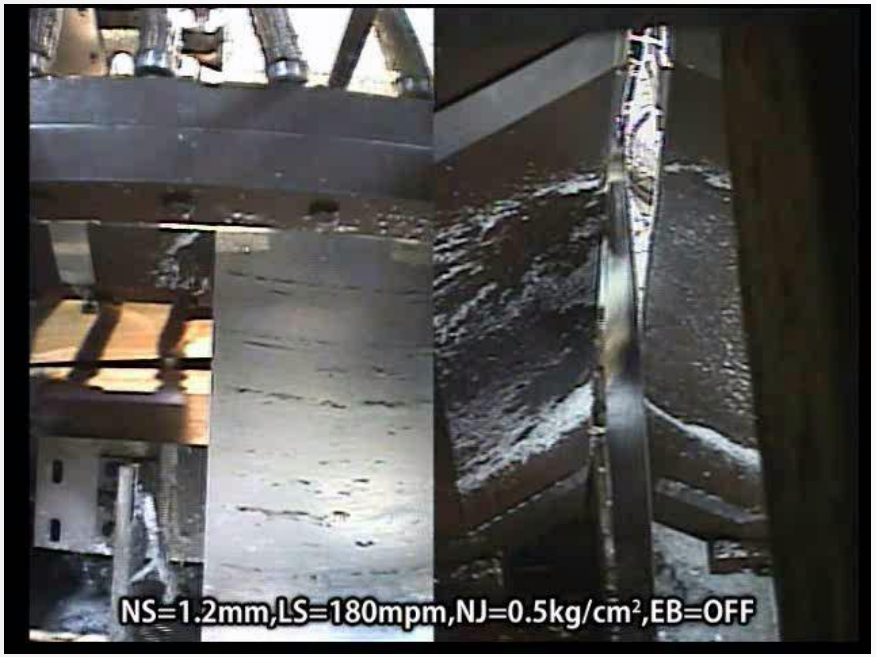


1. Difficulty of High Speed CGL Operation

■ Generation of edge splash in High Speed Operation

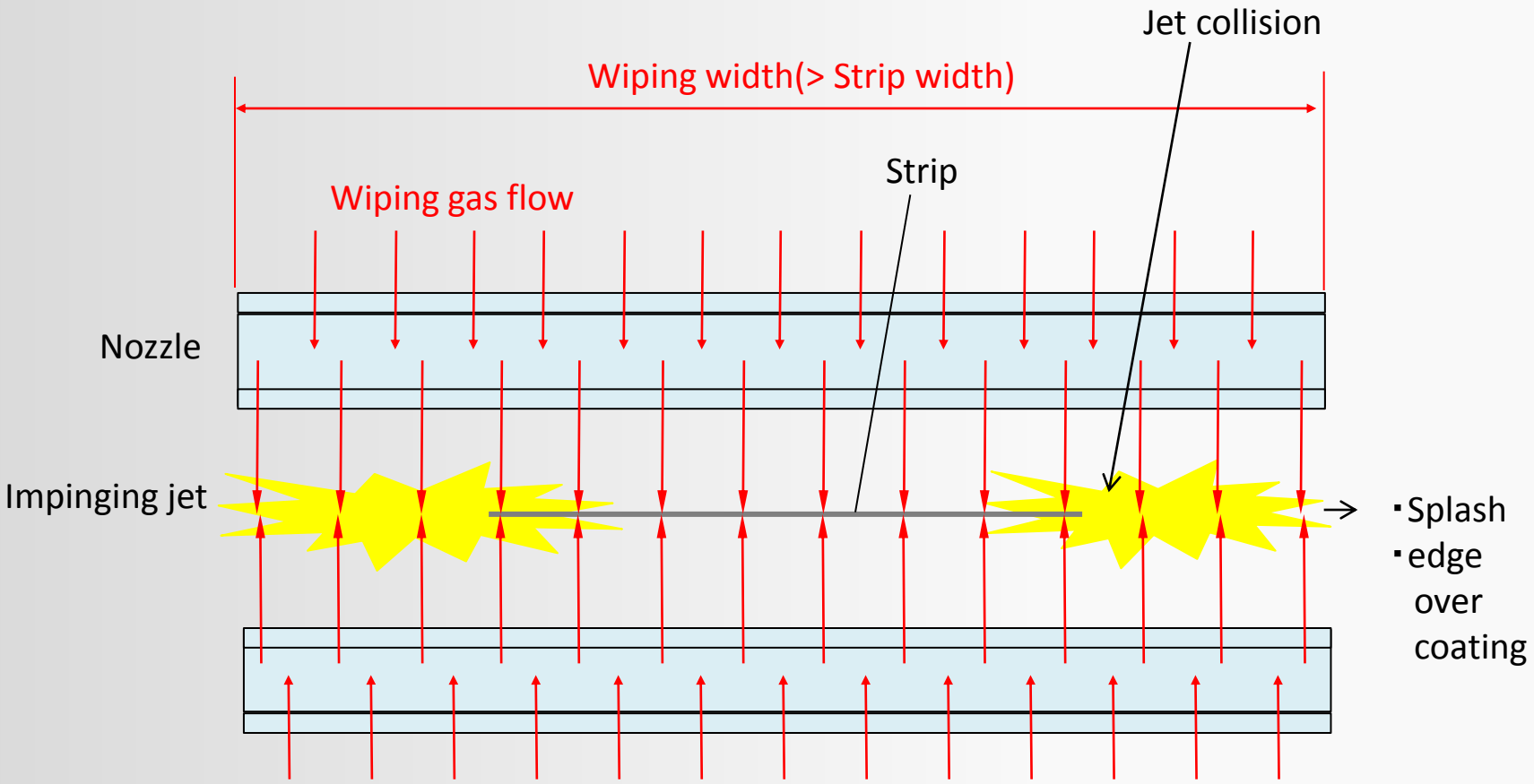
【Operation condition】Nozzle gap：20mm,
LS：160mpm, Gas pressure：0.4kgf/cm^2

【Operation condition】Nozzle gap：20mm,
LS：180mpm, Gas pressure：0.5kgf/cm^2



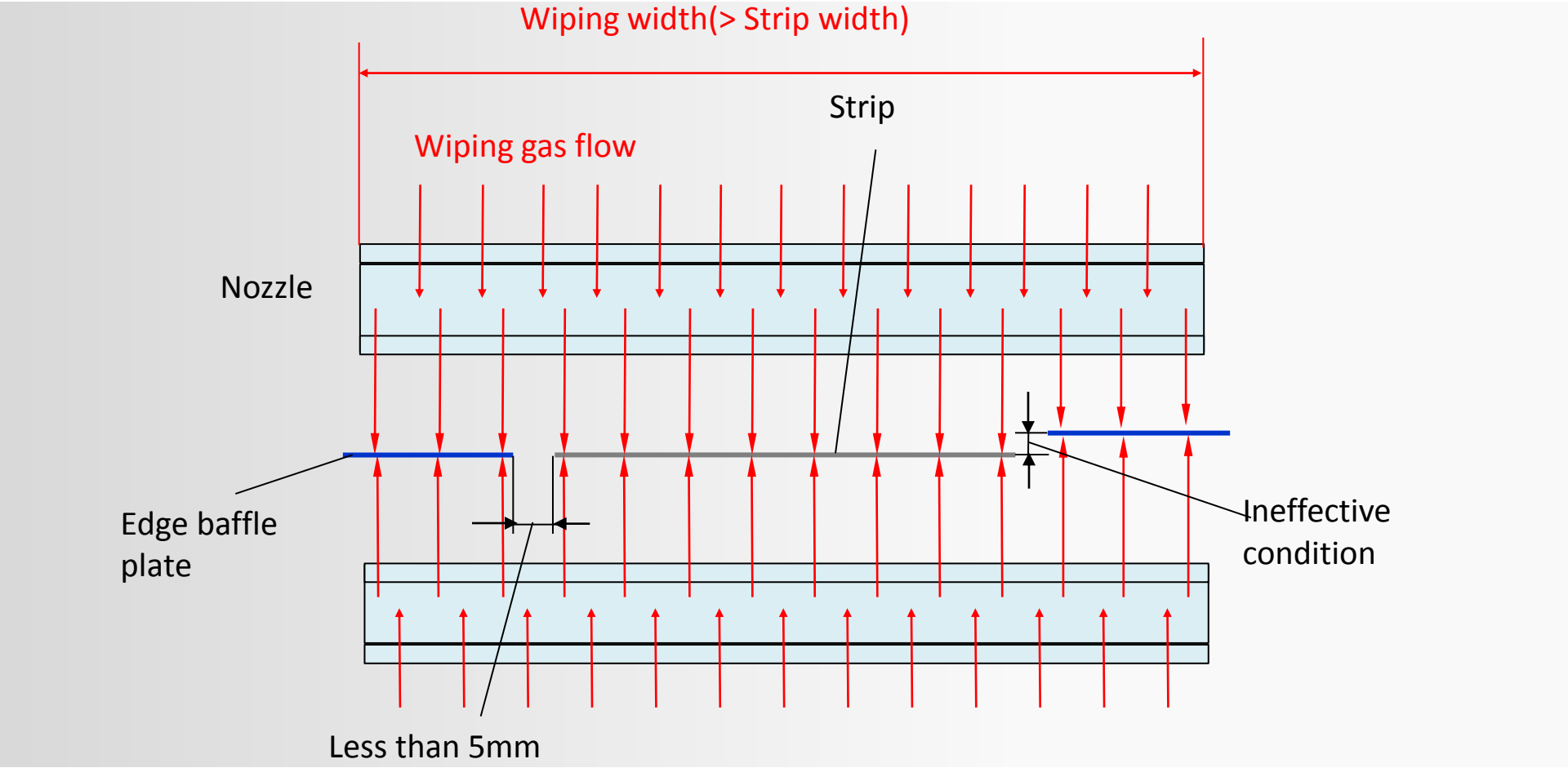
1. Difficulty of High Speed CGL Operation

■ Ordinary nozzle Jet collision issue



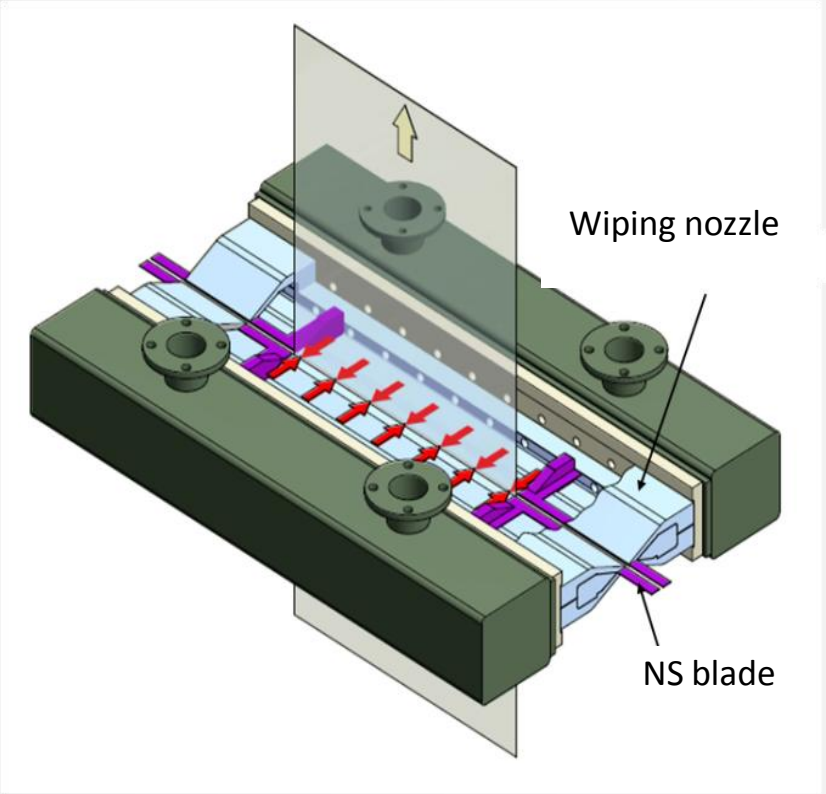
1. Difficulty of High Speed CGL Operation

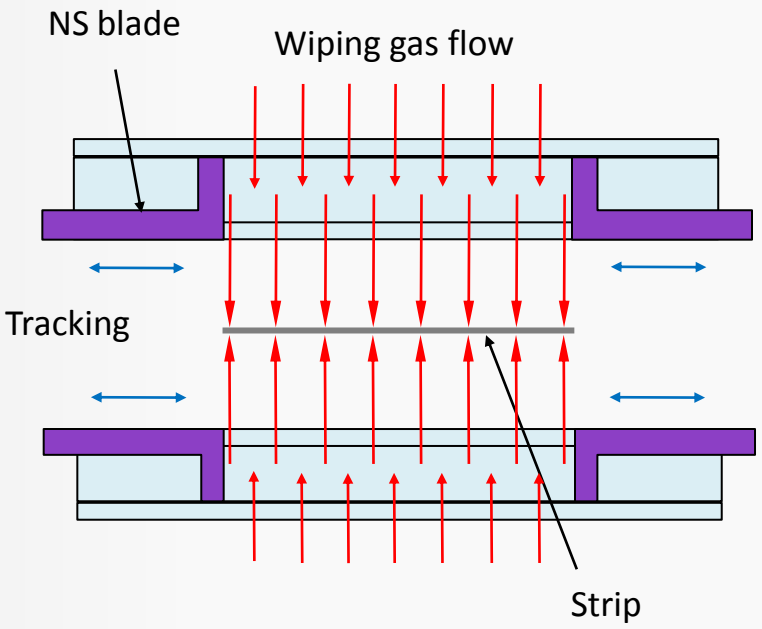
■ Baffle plate issue



2. Features of NS blade

■ Configuration of NS blade Air knife

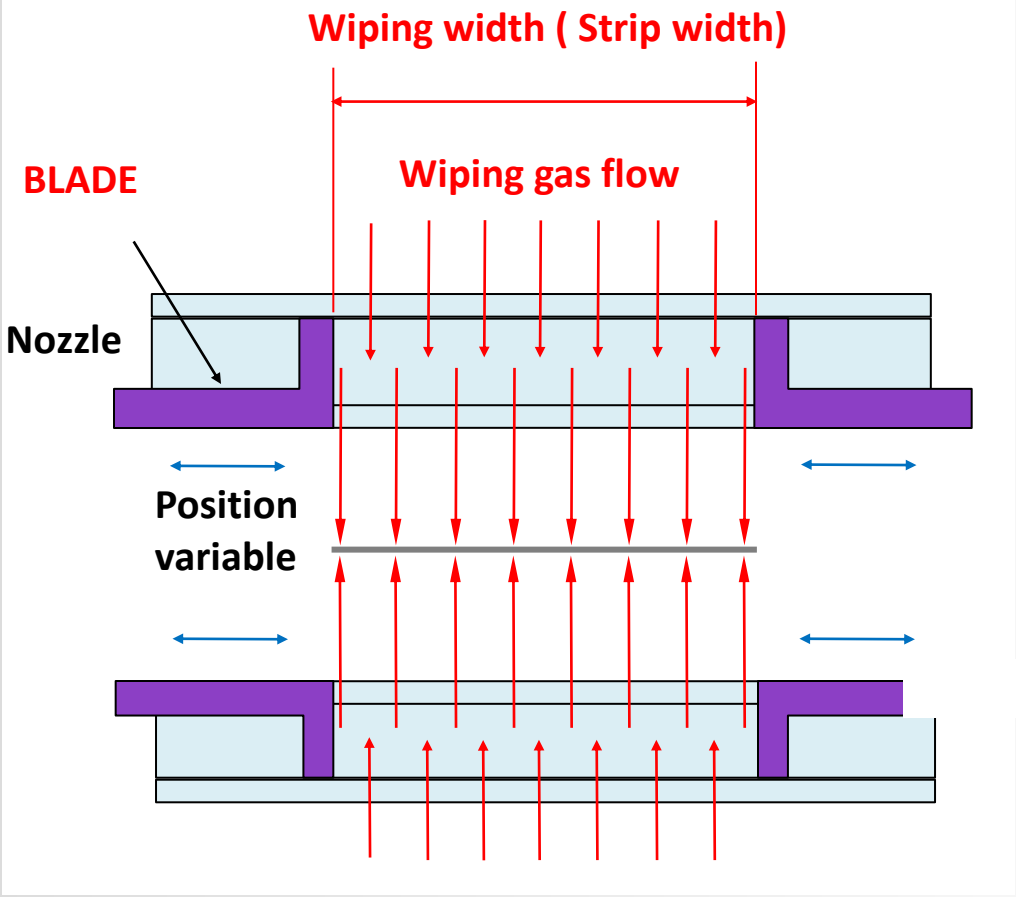




Cross section of nozzle

2. Features of NS blade

■ NS blade advantage



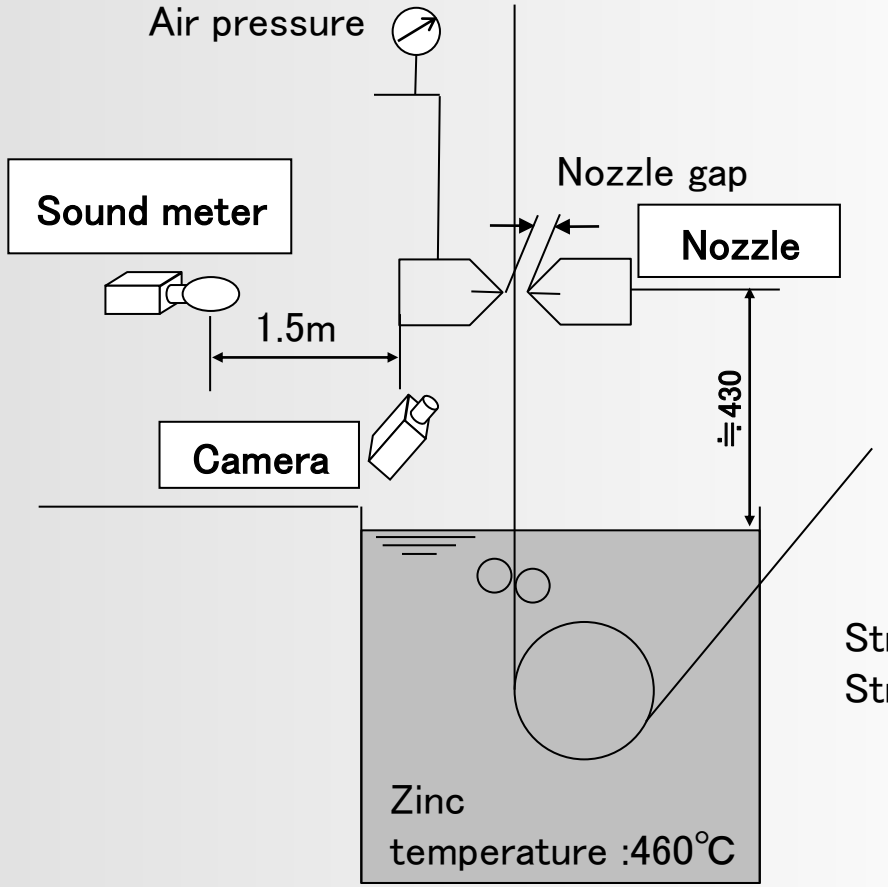
1. Non contact baffle setting
   Safety for high speed operation

2. According to the jet effect, EOC and splash shall be avoided even at high speed operation

*EOC: Edge over coating

3. High speed coating test using NS blade

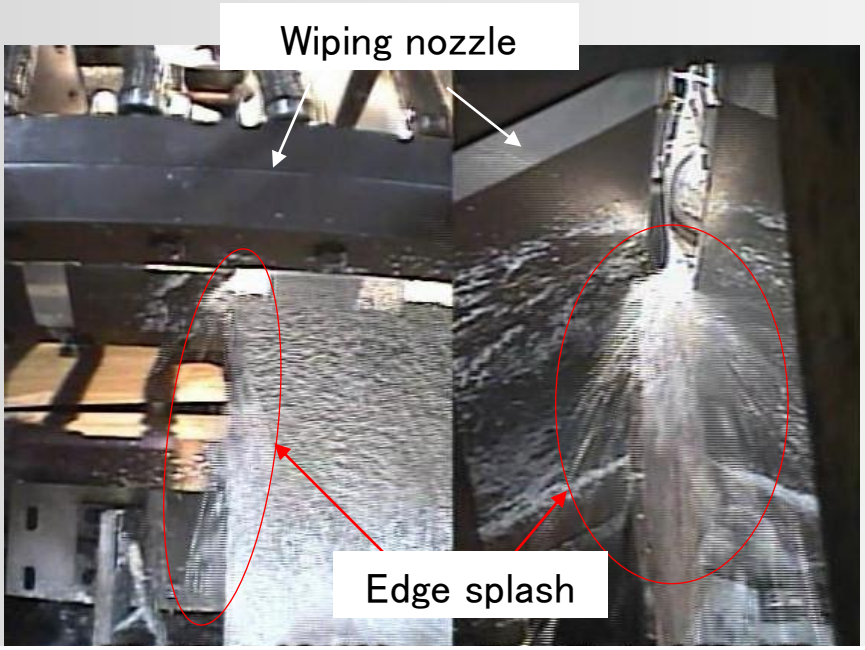
■ Schematic of experiment apparatus



Strip width :280mm
Strip thickness :0.71mm

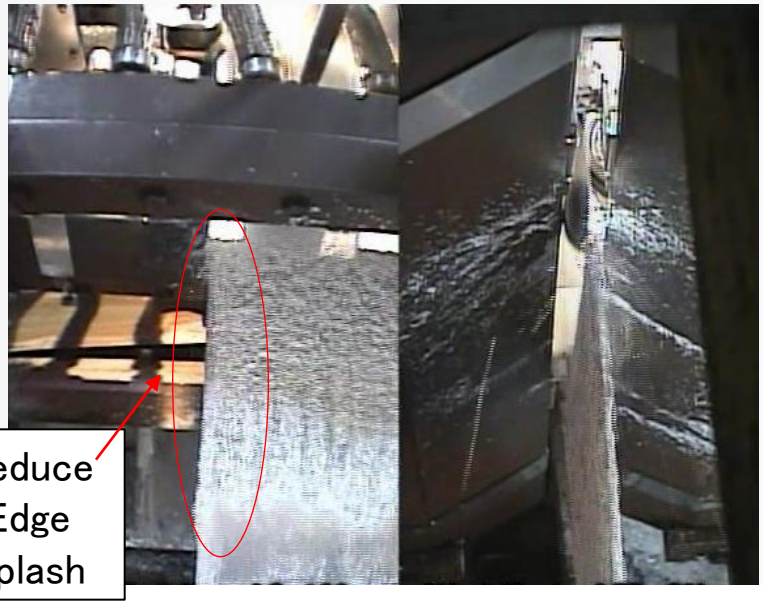
3. High speed coating test using NS blade

■ Test results 1 / Edge splash (Front view and side view)



Front view　　Side view

(a) Ordinary nozzle



Front view　　Side view

(b) *NS blade*

3. High speed coating test using NS blade

■ Test results 1 / Edge splash (Front view and side view)

Play

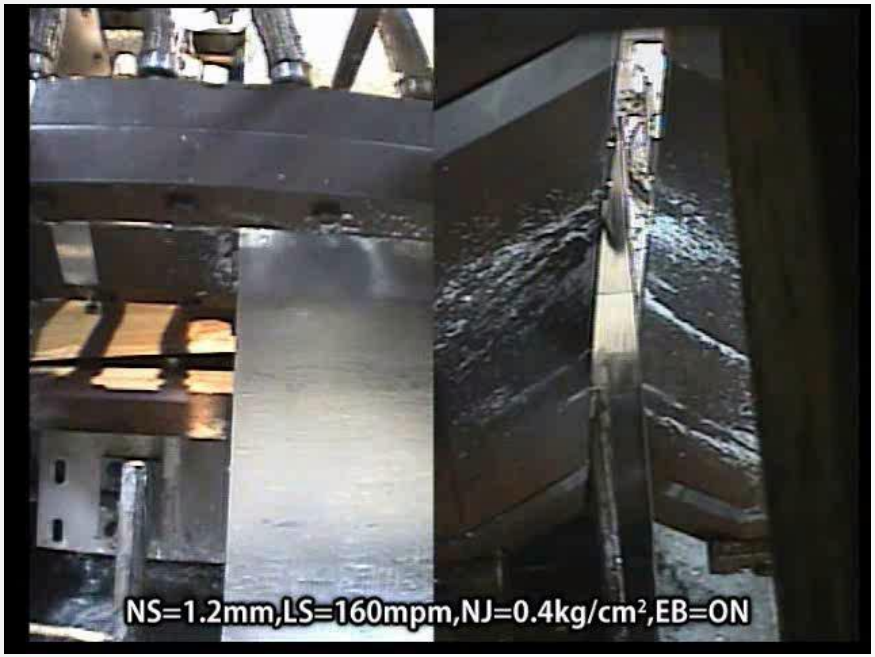
【Operation condition】

Nozzle gap : 20mm

LS : 160mpm　Gas pressure : 0.4kgf/cm^2

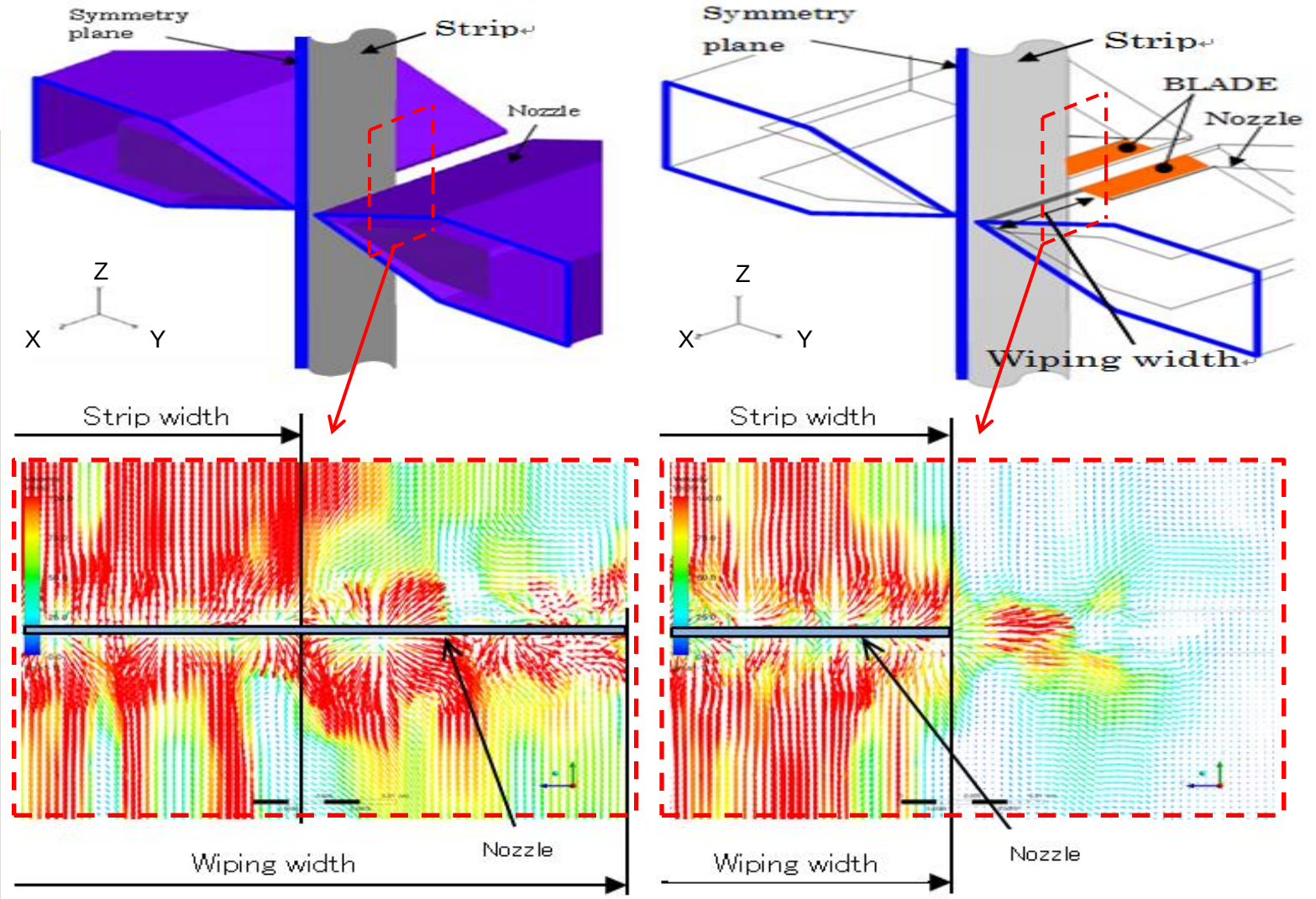
Without NS blade

With NS blade



3. High speed coating test using NS blade

Flow velocity vector



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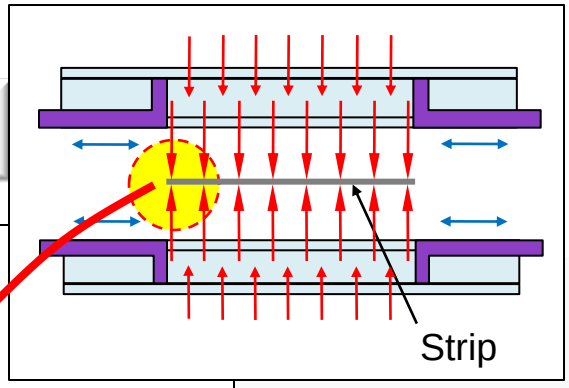
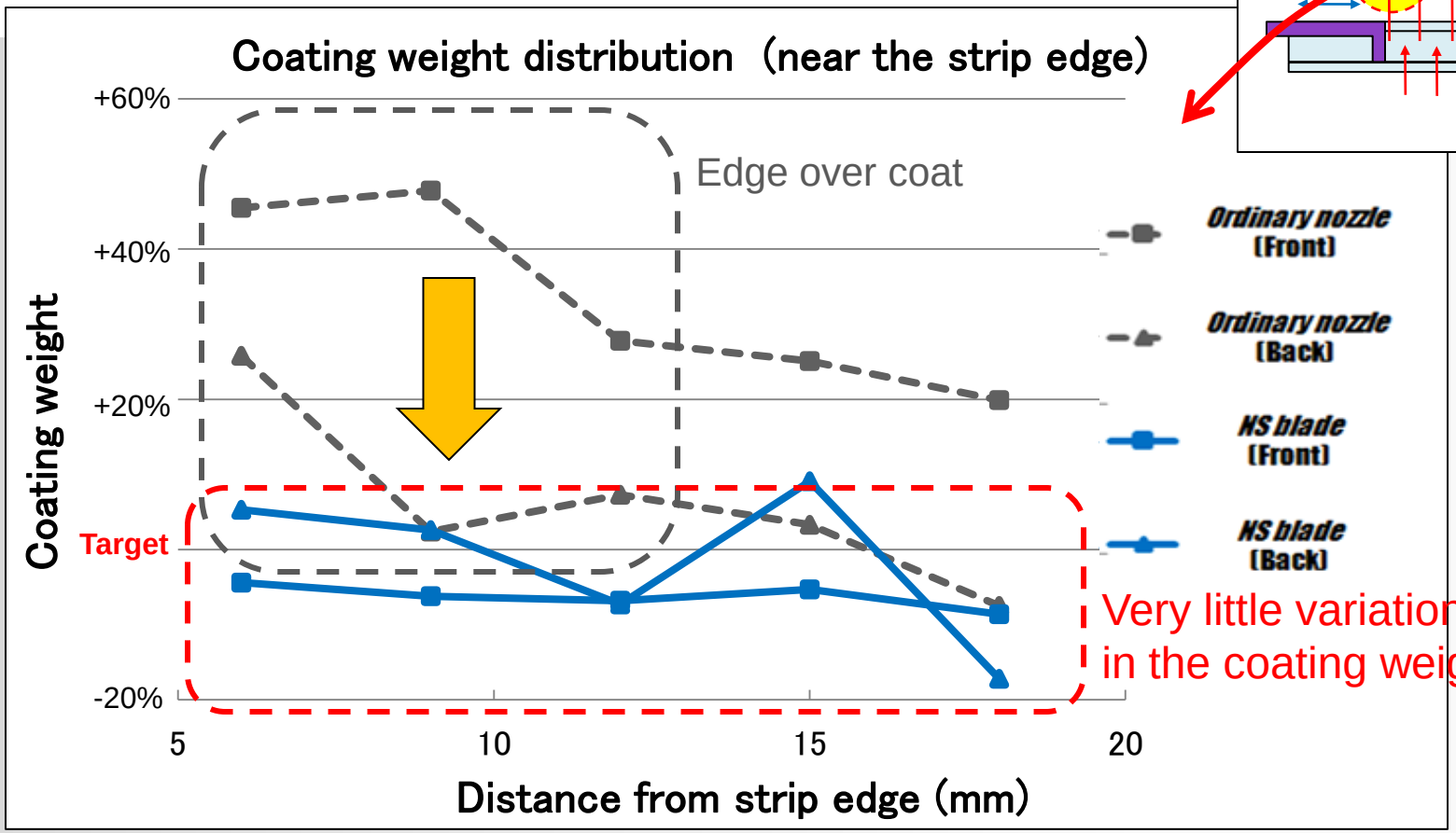
3. High speed coating test using NS blade

■ Test results 2/ Coating thickness distribution

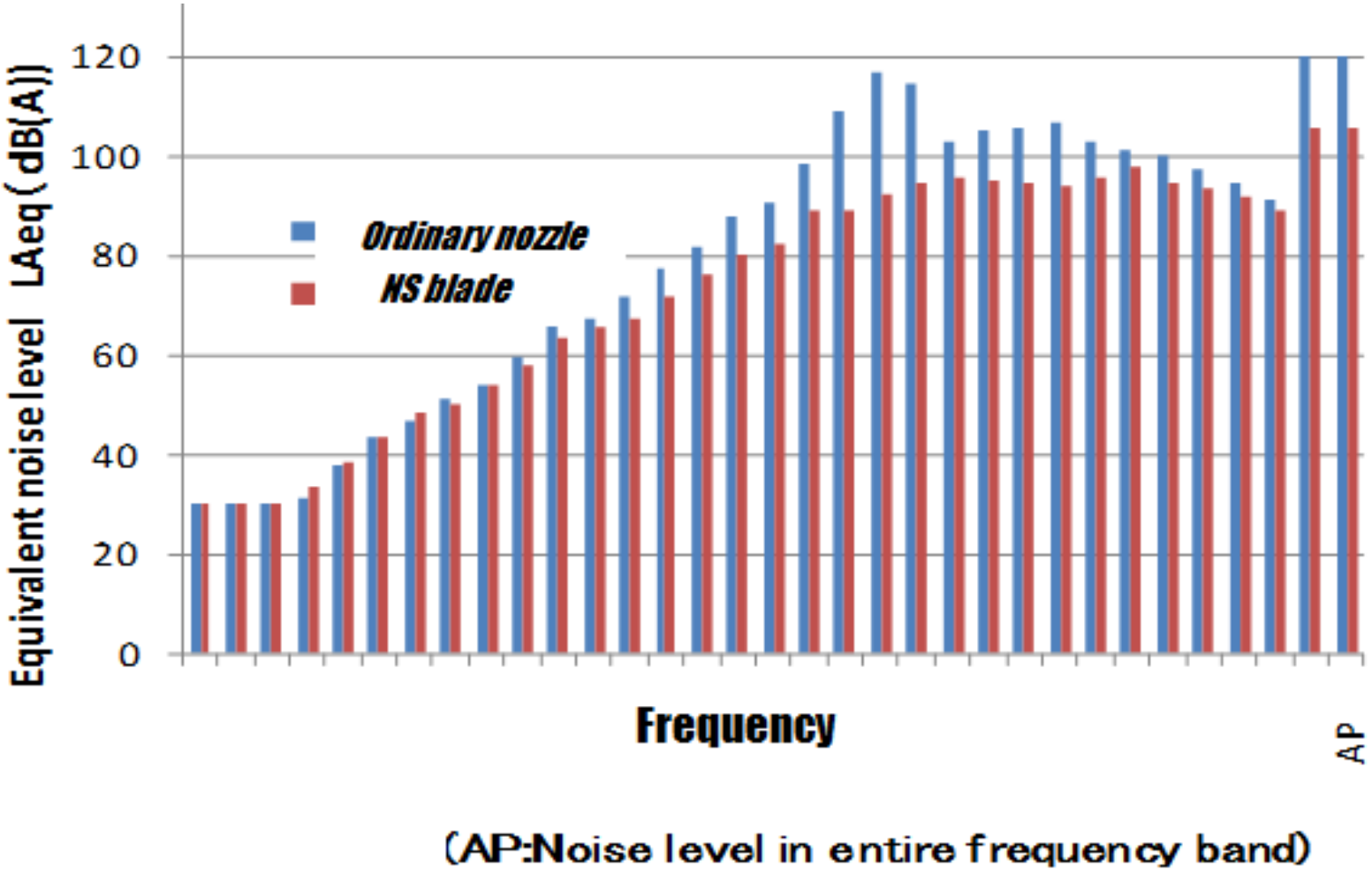




⇒ NS blade is effective in **prevent of Edge over coat** and **allow thin coating**

3. High speed coating test using NS blade

■ Test results 3/ Noise level



(AP:Noise level in entire frequency band)

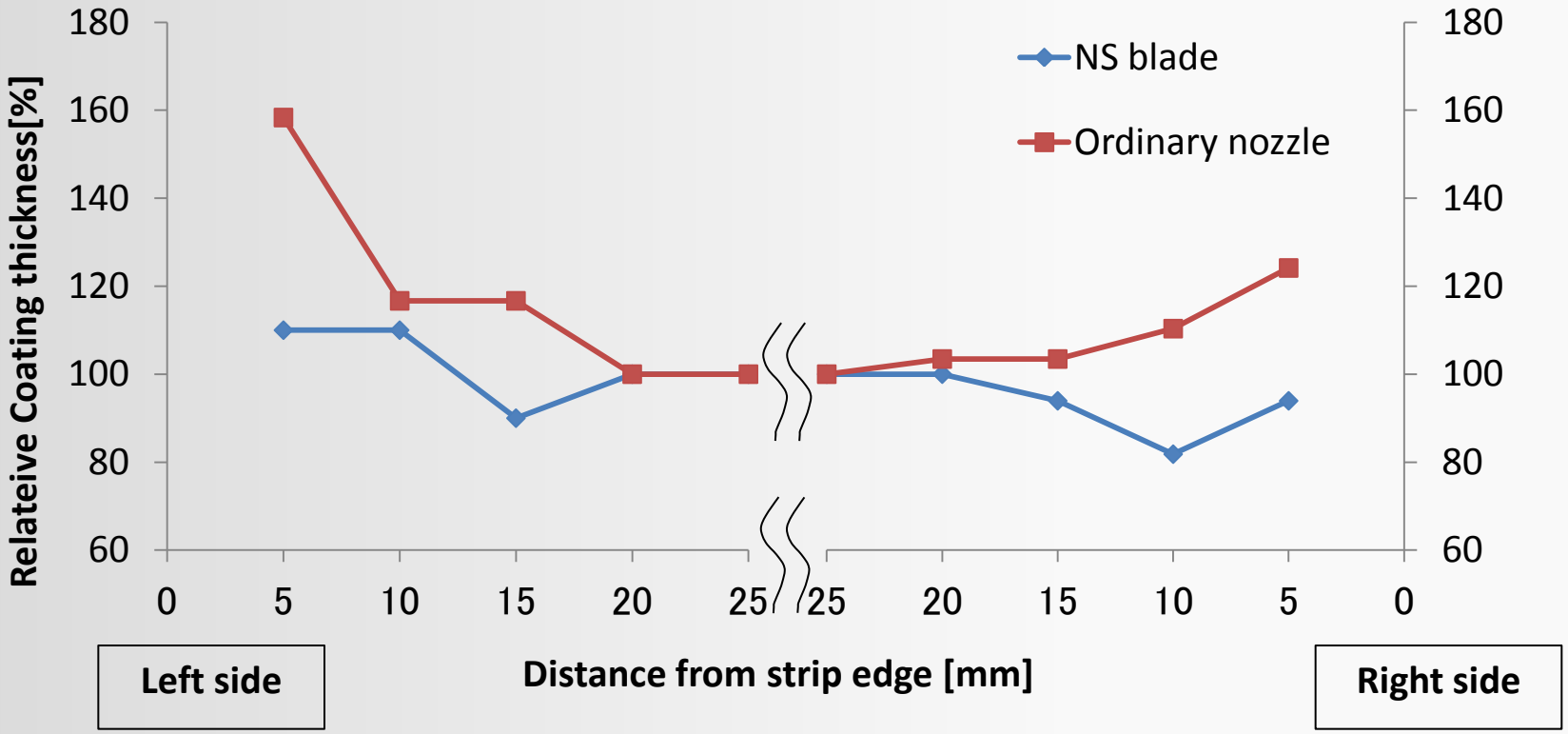
4. Commercial line test

■ Operation condition

	Galvanizing Line	55%Aluminum+Zinc coating line
Coil spec.	0.23mm thick X 914mm width	0.35mm thick X 1200mm width
Line speed	160mpm	150mpm
Coating thickness	Z08(40g/m^2 per side)	AZ40(20g/m^2 per side)
Splash	None	None
Overcoat	None	None

4. Commercial line test

■ Coating weight distribution



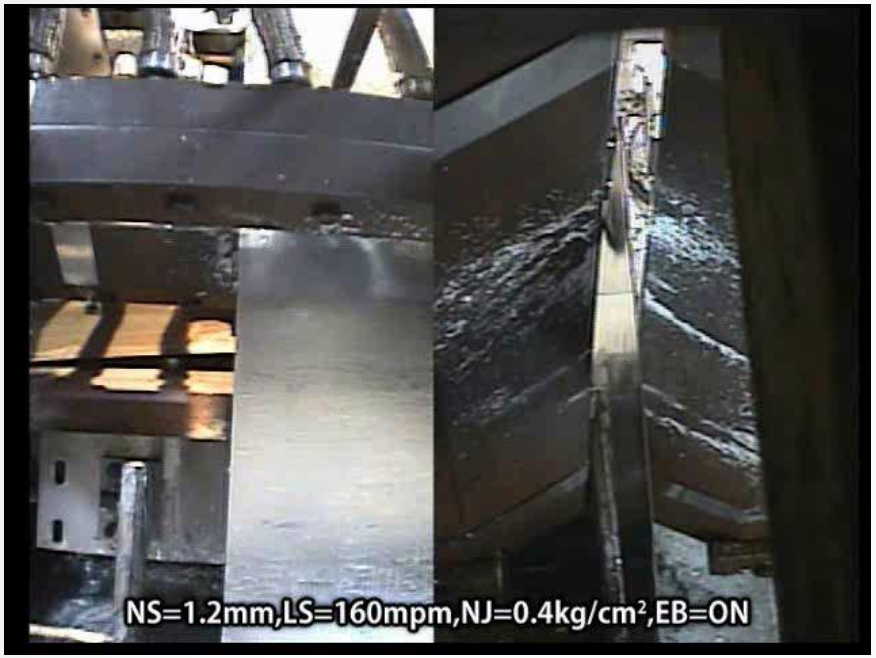
5. Conclusion

Play

■ Coating test at test line ⇒ Reduce EOC, noise level and zinc splash

Without NS blade

With NS blade



■ Commercial line operation (GI and 55% Al+Zinc bath)

⇒ Achieve maximum line speed and minimum coating weight operation

Thank you for your attention.