

# Validation and Simulation

Performance comparison with Brass wire and SPW+β on real machine, According to one machining sample, describing "Machining Characteristics Validation" and "Profit Simulation".

## Machining Characteristics Validation:

### Comparison of machining speed

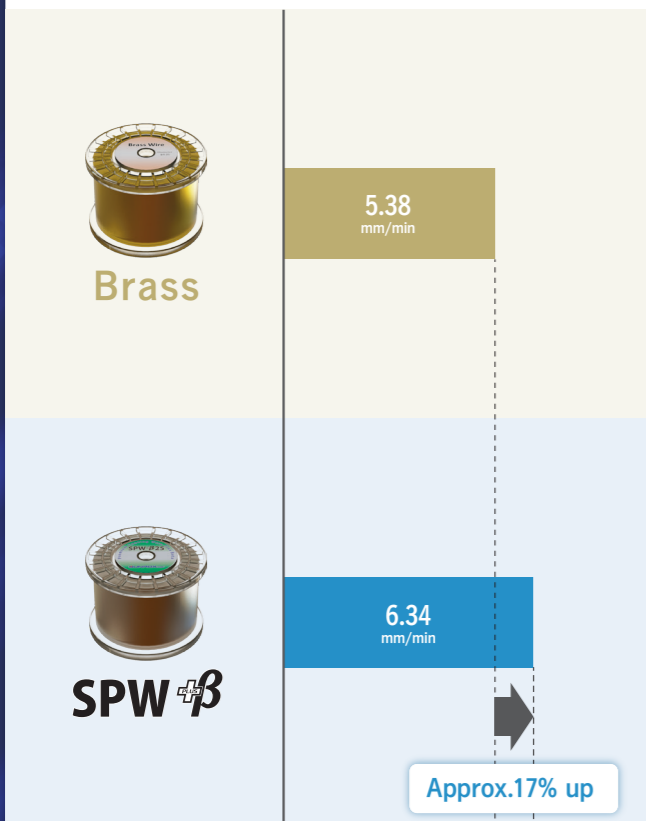
Compared the machining speed at straight part with each wire.

Machining condition	M/C model	MITSUBISHI NA-1200P
	Work material	SS400
	Thickness	12mm
	Wire diameter	φ0.25
	M/C Parameter	The same as brass wire
	Number of cut	1st Cut

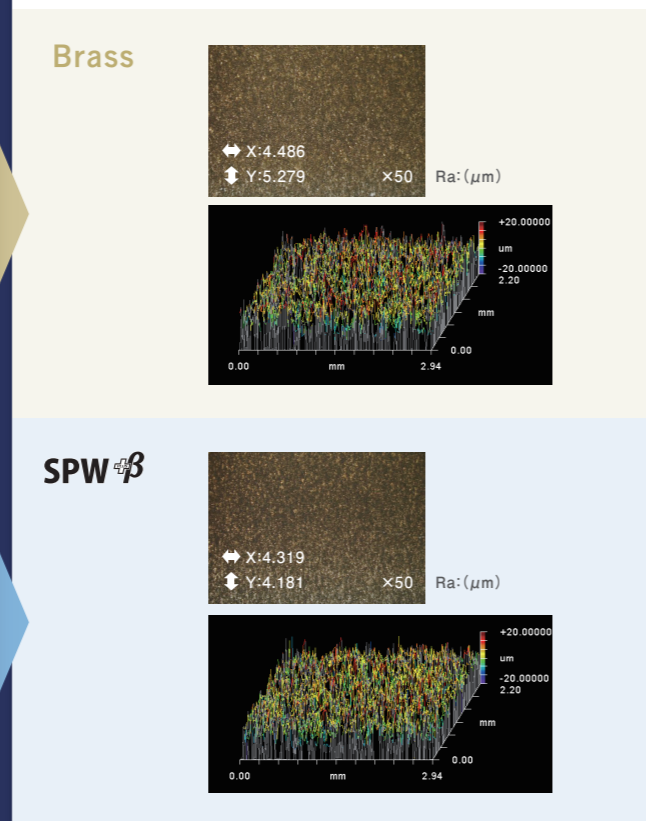
### Measurement of surface roughness

Compared the surface roughness of workpiece after machining.

Measurement equipment / material	Picture processing	Microscope
	Roughness measurement	Scanning white light interferometer (zygo® New View 5032-2)
	Measured material	12mm Center part measured



Result [Machining speed] **17.8% up!**



Result [Machining surface roughness] **More than equivalent**

Just change the wire (No change of parameter), get increasing 17.8% machining speed. In addition, surface roughness doesn't degrade even increasing of machining speed.

\* The result might change depends on machine model/material/machining parameter.

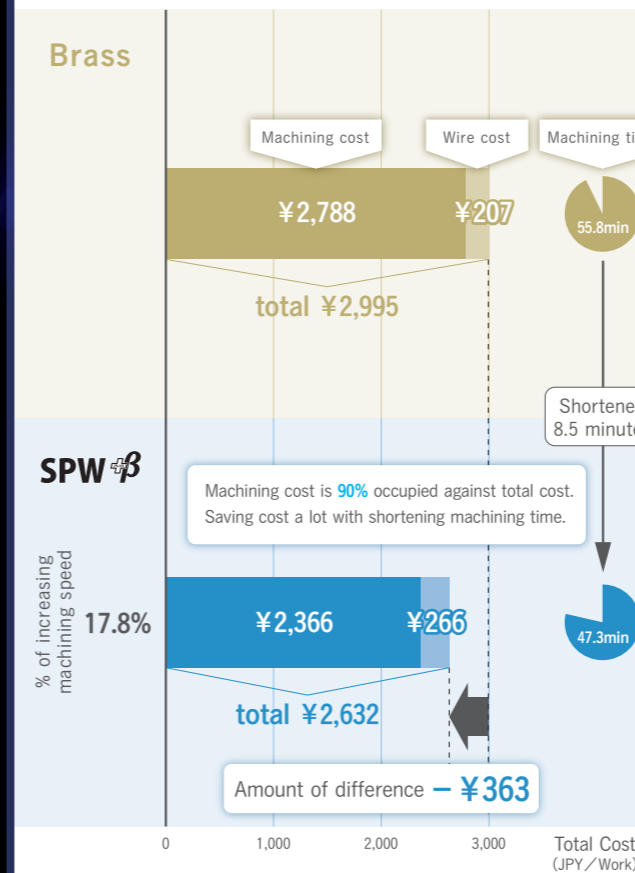
## Profit Simulation

### Cost simulation

Simulating the cost for one workpiece

Simulating condition	▶ Machining condition		▶ Wire condition	
	a Machining speed:	Brass: 5.38 mm/min (0.412YEN/m)	e Brass:	1000 YEN/Kg (0.412YEN/m)
	SPW+β: 6.34 mm/min		f SPW+β:	1500 YEN/Kg (0.633YEN/m)
	b Wire feeding:	9 m/min		
c Machining length:	300 mm			
d Machining cost:	3000 YEN/h			*Machining cost (Labor cost + Equipment cost + etc)

Formula	A: Machining time	= c / a	D: Machining cost	= d × A
	B: Wire consumption(m)	= A × b	E: Total cost	= C + D
	C: Wire cost (YEN)	= B × e or f		



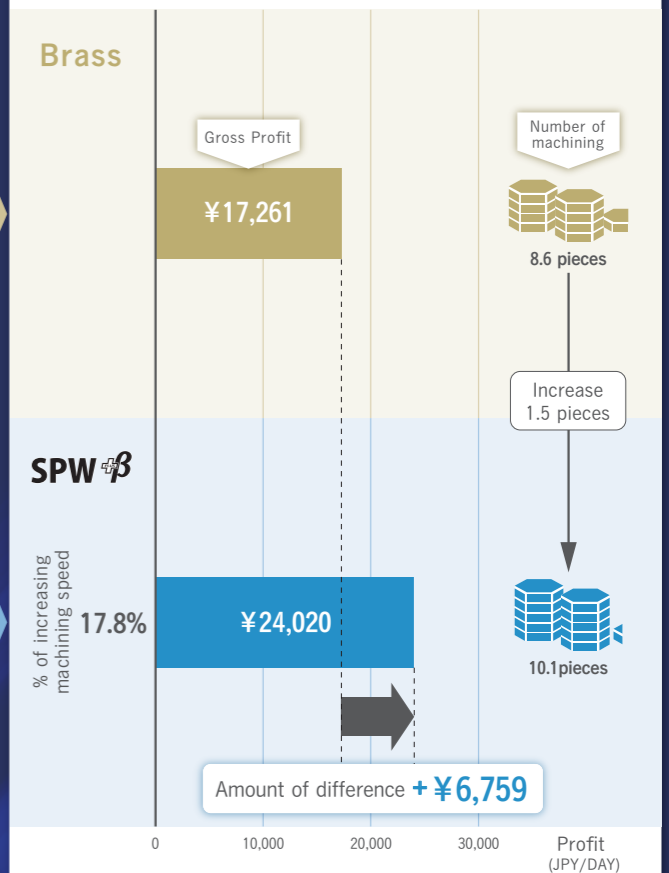
Result [Cost] **Approx. 12.1% down** (JPY363.00/work)

### Profit simulation

Simulating the profit per day

Simulating condition	▶ Output condition	
	g Working time:	8 h/day
	h Machining unit price:	5000 YEN/workpiece
	i working day:	22 days/month

Formula	F: Number of machining	= g ÷ A	I: Gross profit	= H - G
	G: Expense	= E × F	Monthly profit	= I × i
	H: Sales amount	= F × h		



Result [Profit] **Approx. 39.2% up!** (JPY6,759.00/day)

As reducing machining time, enable a cost saving and increasing of productivity, as a result, increasing 39.2% of profit (JPY148,703.00/month.)

\*This result is according to simulation, real result might be difference.