

# Comparative Performance of Galvanizing with Continuously Applied Zinc-Aluminum- Magnesium Coatings

## Results of Exposure Tests in Japan

Hiroshi Shibayama

Japan Galvanizers Association

# Comparative Performance

- Hot Dip Galvanizing

Conventional Zn coating

Alloy coating Zn+5%Al+1%Mg

- CGL

Zn+6%Al+3%Mg

Zn+11%Al+3%Mg+0.2%Si

# Test pieces

	Coating	Type	Chemical composition	Coating weight (g/m <sup>2</sup> )	Cut edge
<b>A1</b>	Alloy coating	CGL	Zn-6%Al-3%Mg	125	Not painted
<b>A2</b>	ditto	ditto	ditto	125	painted
<b>B1</b>	Alloy coating	CGL	Zn-11%Al-3%Mg-0.2%Si	175	Not painted
<b>B2</b>	ditto	ditto	ditto	175	painted
<b>ZAd</b>	Alloy coating (A)	Hot dip	Zn-5%Al-1%Mg	350	-
<b>ZAe</b>	Alloy coating (B)	Hot dip	Zn-5%Al-1%Mg	350	-
<b>HGd</b>	Galvanizing (A)	Hot dip	Zn>99.995%	550	-
<b>HGe</b>	Galvanizing (B)	Hot dip	Zn>99.995%	550	-
<b>PW</b>	Galvanizing (A)	Hot dip	Zn>98.5%	550	-

# Cycle corrosion test condition

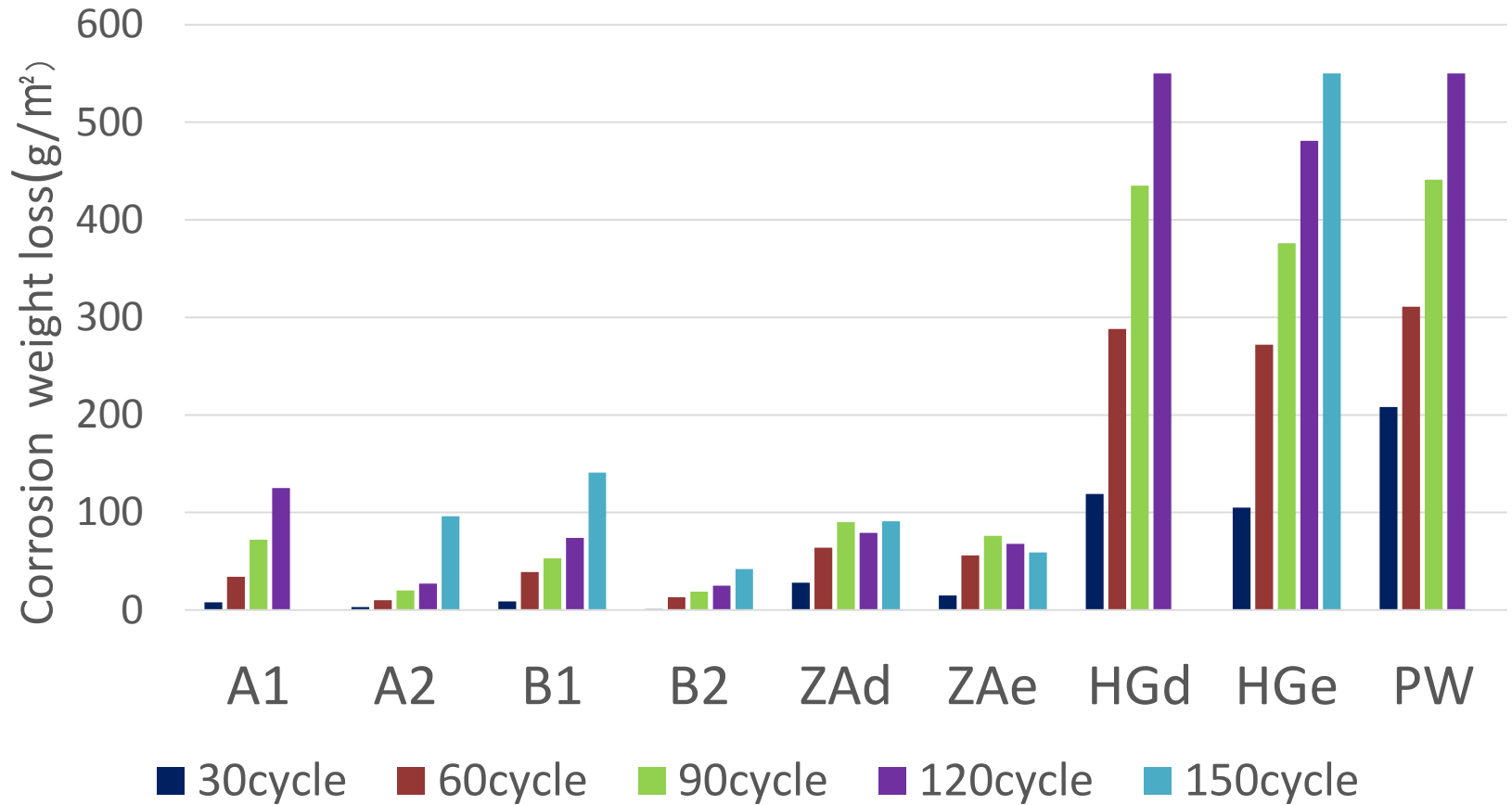
Items		Condition
Angle of test pieces		15~30° to vertical
Salt spray	Temperature	35±1 °C
	NaCl concentration	50±5 g/l
drying	Temperature	60±1 °C
	Relative humidity	20~30%RH
wetting	Temperature	50±1 °C
	Relative humidity	95< %RH
Time of each process in a cycle Transition time included		1cycle      8hours
		Salt spray      2hours
		drying      4hours
		wetting      2hours
Transition time : time to specified condition		Spraying to drying within 30 min.
		Drying to wetting within 15 min.
		Wetting to spraying within 30 min.

# Area ratio of rust on the surface(%)

0% no rust, 100% fully rusted

	30 cycle	60 cycle	90 cycle	120 cycle	150 cycle	180 cycle
A1	0	0	5	30	70	95
A2	0	1	3	12	20	30
B1	0	0	1	4	7	12
B2	0	0	0	3	6	12
ZAd	0	0	0	0	2	5
ZAe	0	0	0	2	4	8
HGd	0	0	12	62	92	-
HGe	0	0	5	30	85	-
PW	0	0	30	100	-	-

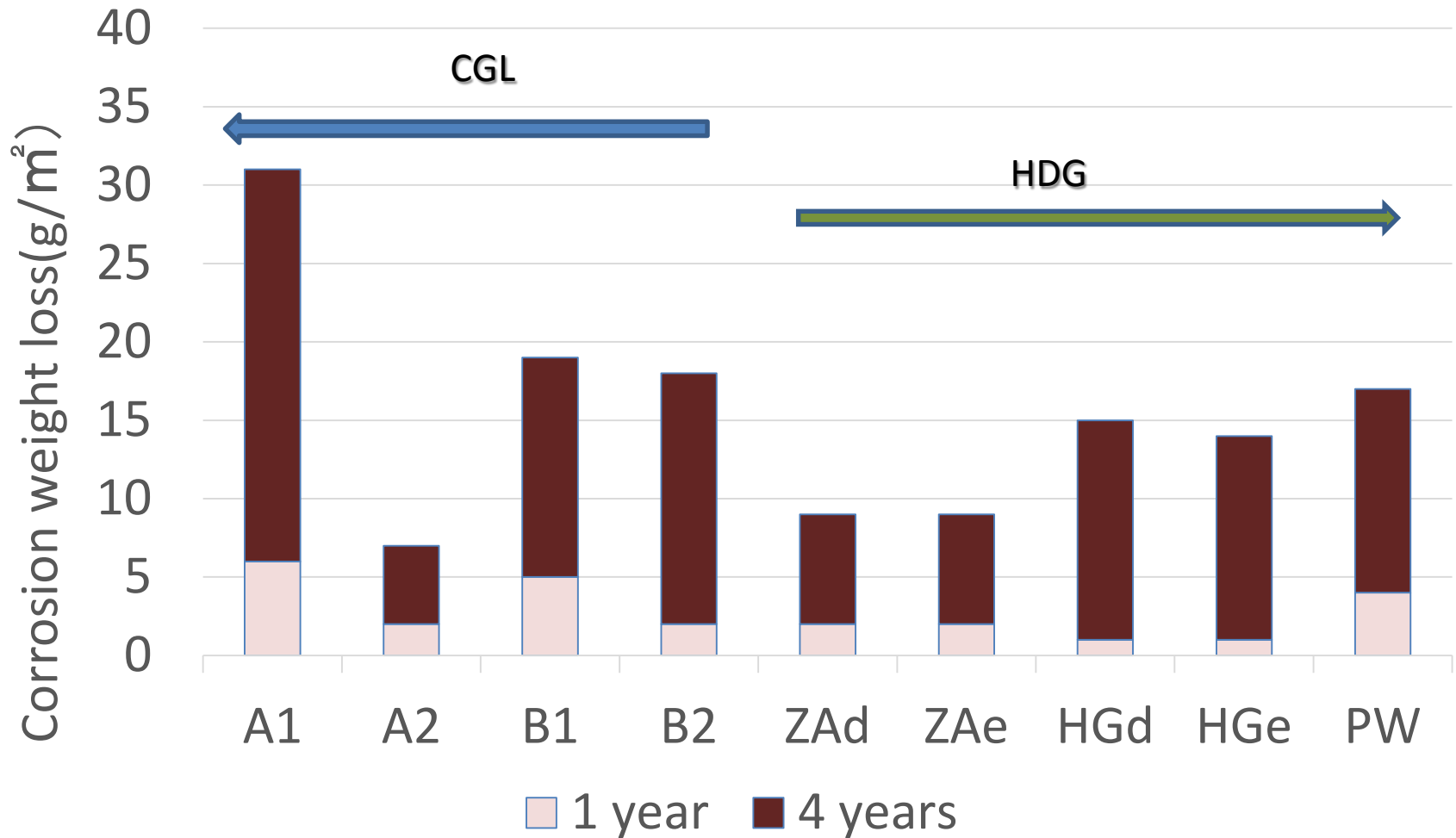
# Corrosion weight loss after cycle test



# Corrosion weight loss in rural area

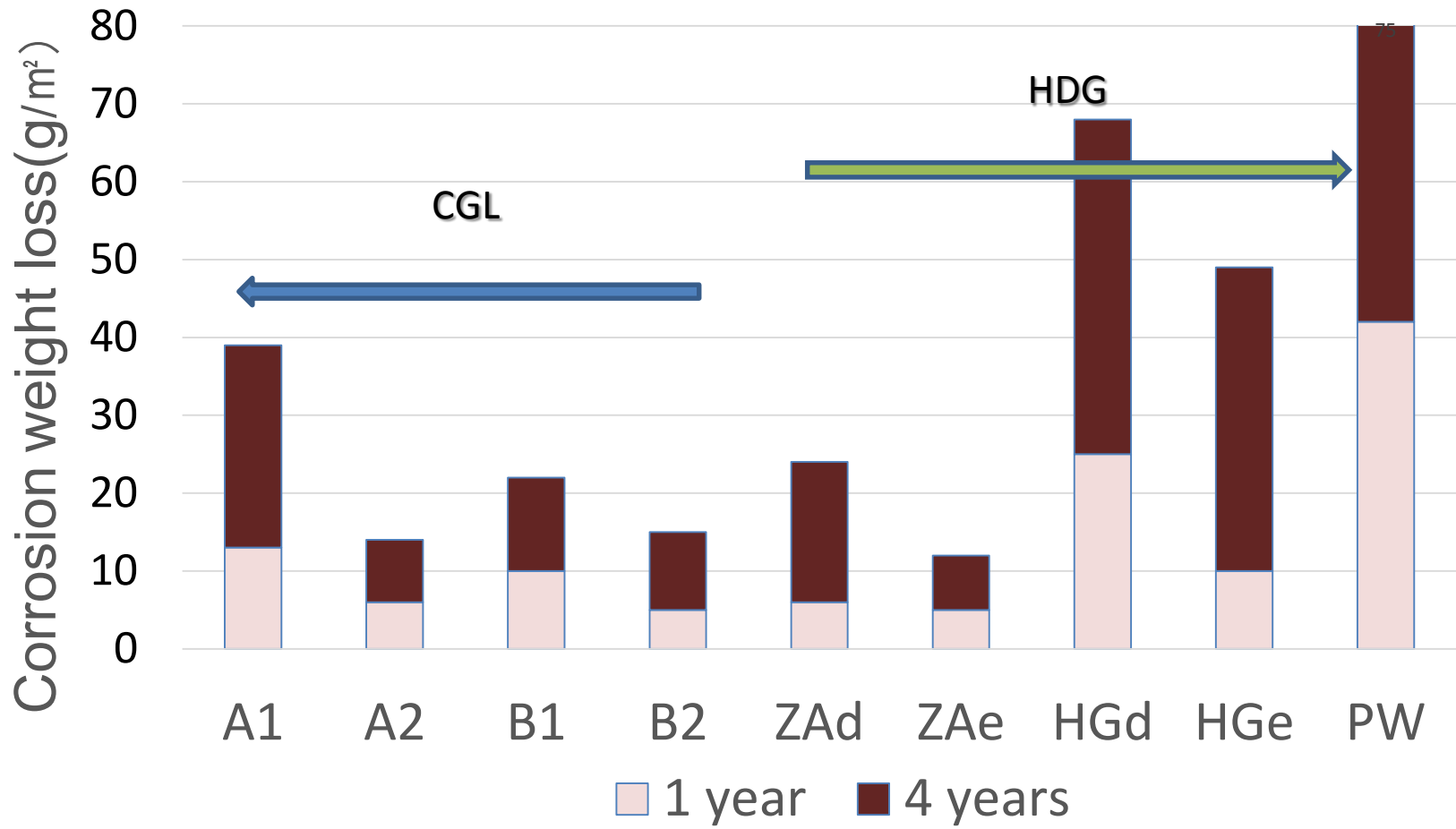


# Corrosion weight loss in urban area

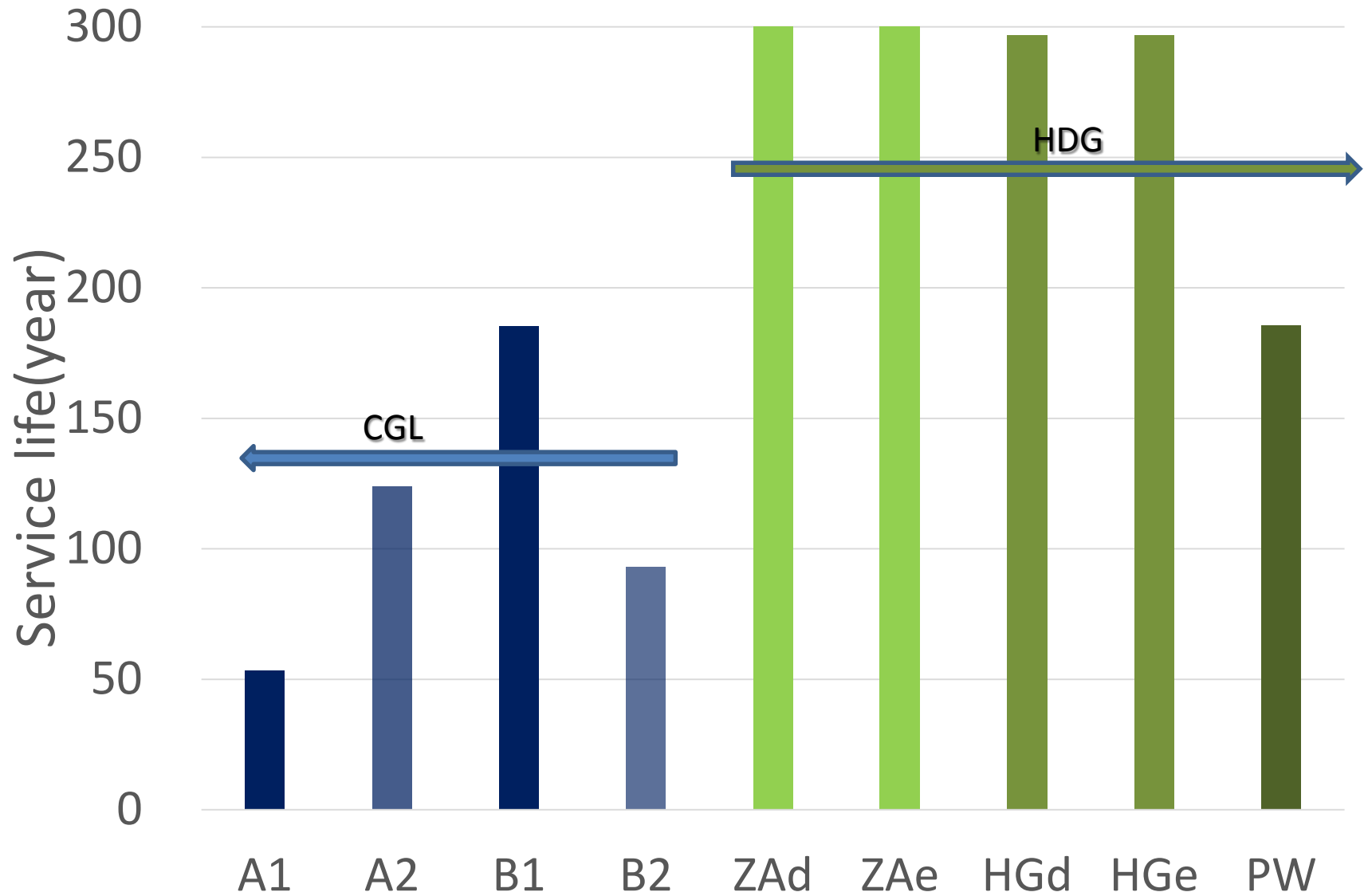




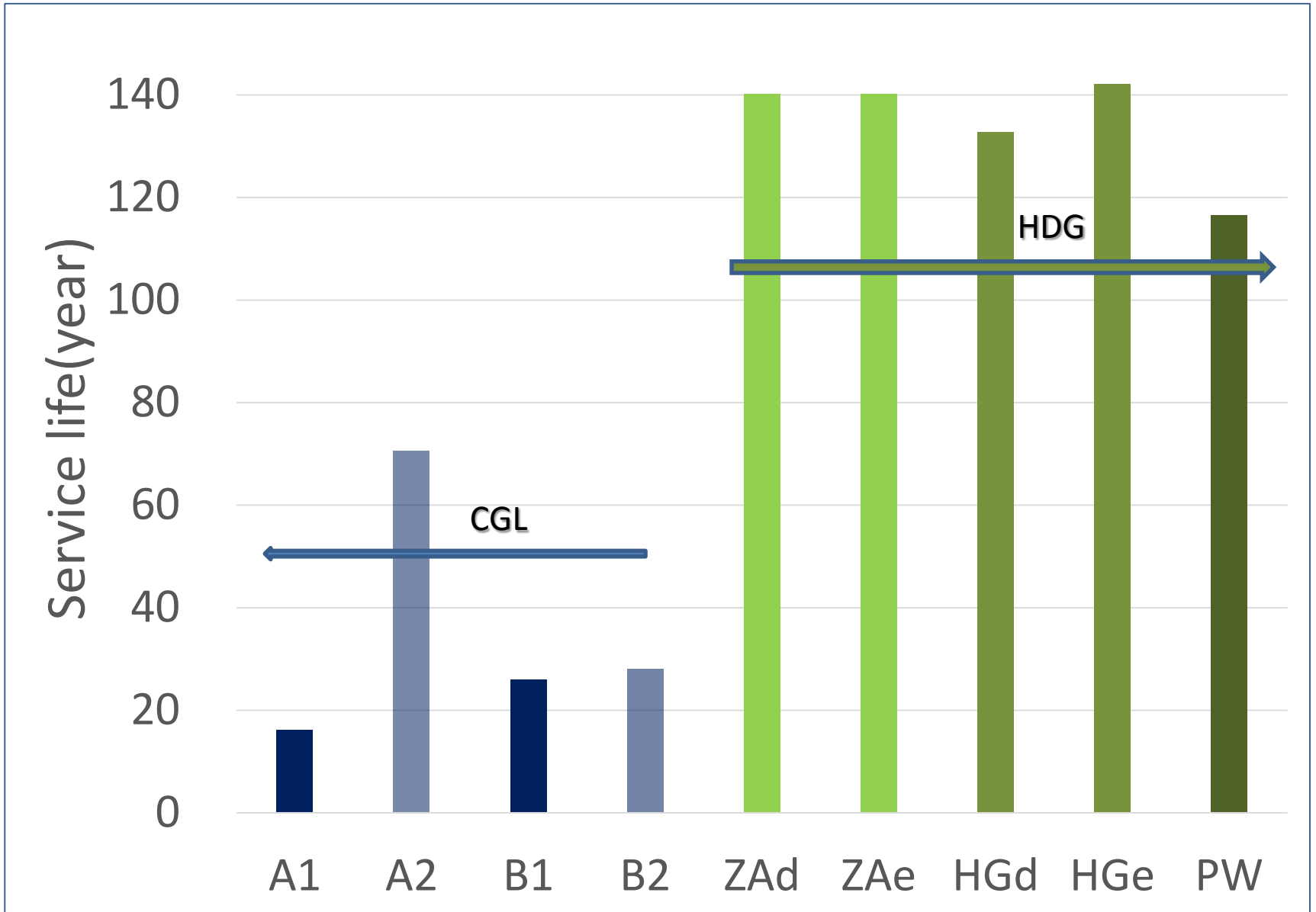
# Corrosion weight loss in coastal area



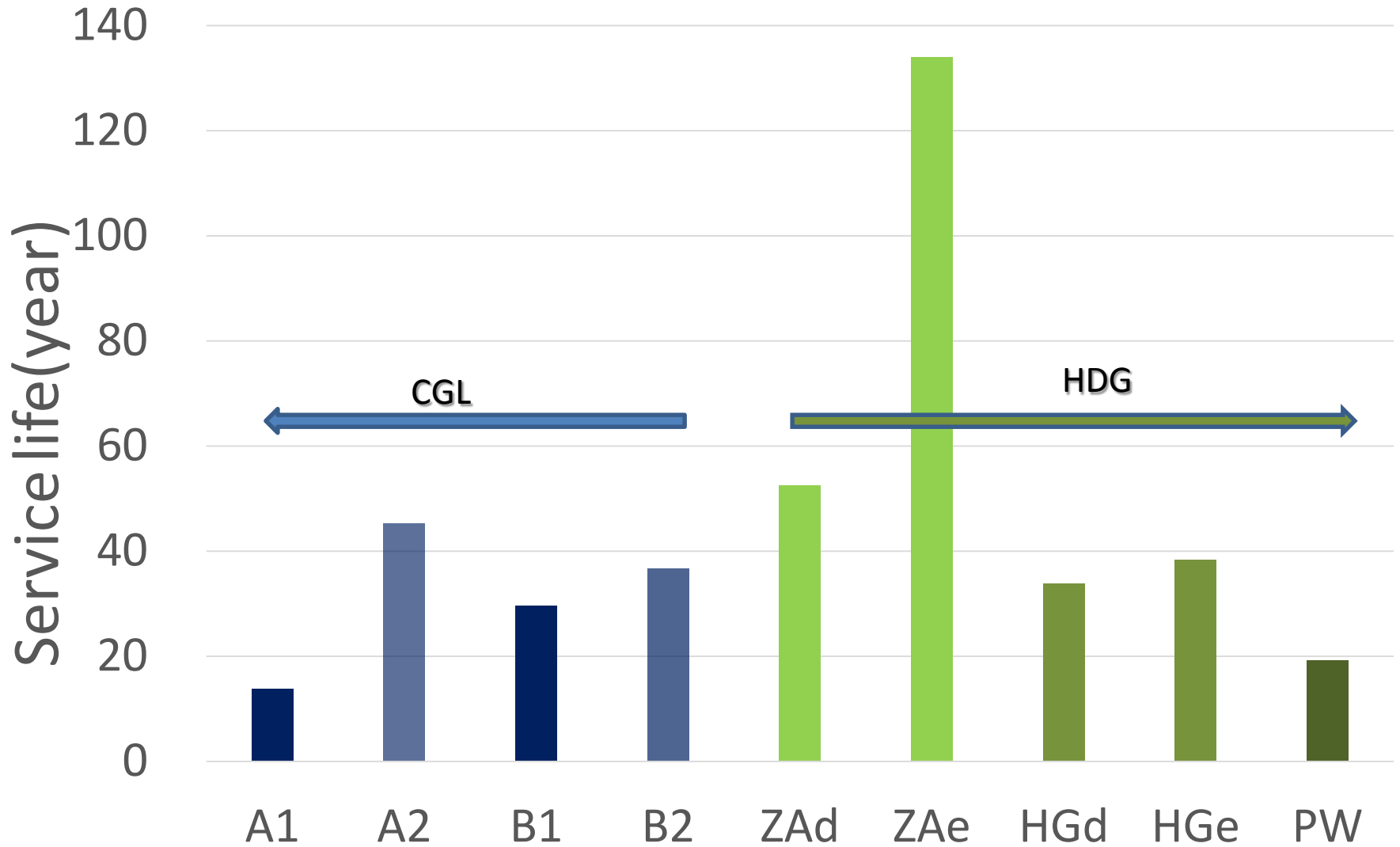
# Service life in rural area



# Service life in urban area



# Service life in coastal area



# Performance of corrosion protection

## 【Comparison of service life】

In rural area and urban area

HDG ≒ HD Alloy > CGL Alloy

In coastal area

HD Alloy > HDG ≒ CGL Alloy