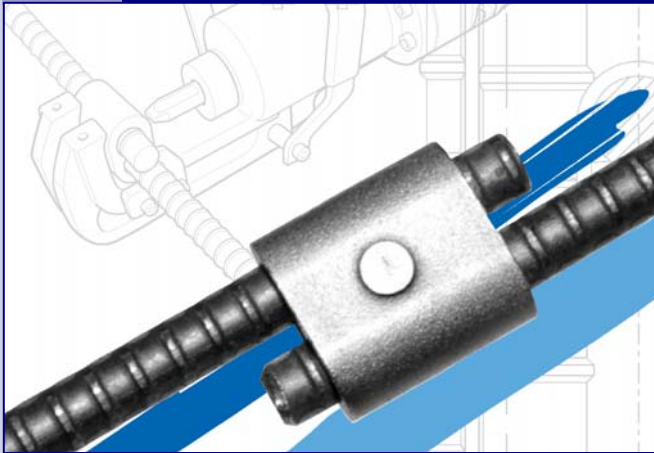


Mechanical lap splicing for rebars

OKABE Splice Clip joint (OS Clip joint)



OKABE Co.,Ltd.

OS Clip joint consists of . . .

- An oval shaped steel sleeve with a wedge-hole
- A wedge pin

Connection for small diameter Rebars . . .

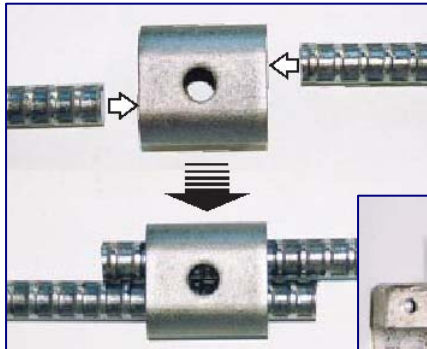
- The sleeve is positioned around two overlapping rebars.
- The wedge pin is driven into a wedge-hole with a portable hydraulic wedge-driver, and between the rebars.

Features . . .

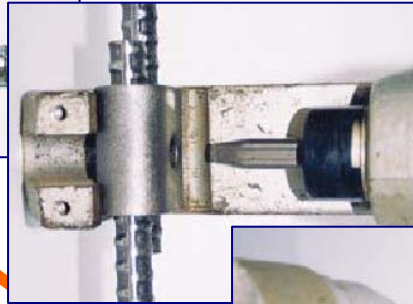
- Simple and Quick
- High reliability
- Skilled workers not required
(Pls be sure to follow instruction)
- Can make under almost any weather condition.
- Certified by Japanese evaluation organization.



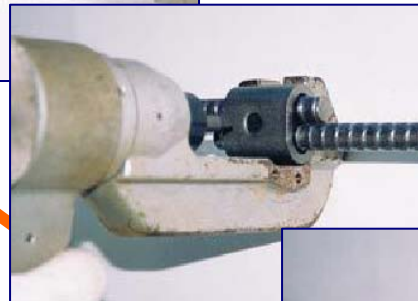
OS Clip joint - Installation procedures



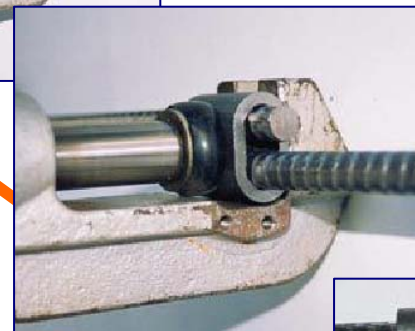
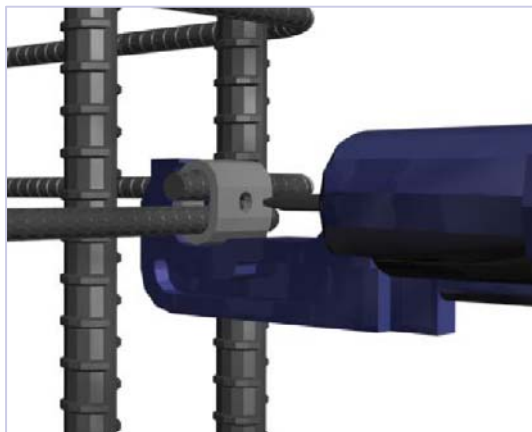
Place the sleeve over one end of the rebar;
Each bar extends out of the sleeve at least
one bar-diameter.



Place the wedge pin with the wedge-
driver.



Operate the wedge-driver.



Check the completion
of pin-driving.



OS Clip joint — Dimensions

Note: The figures indicats below is JAPAN only.

■ Sleeve

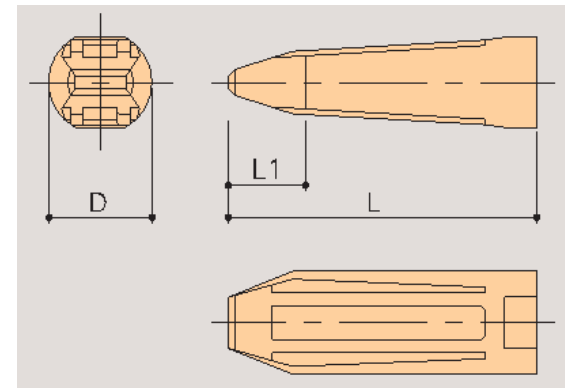
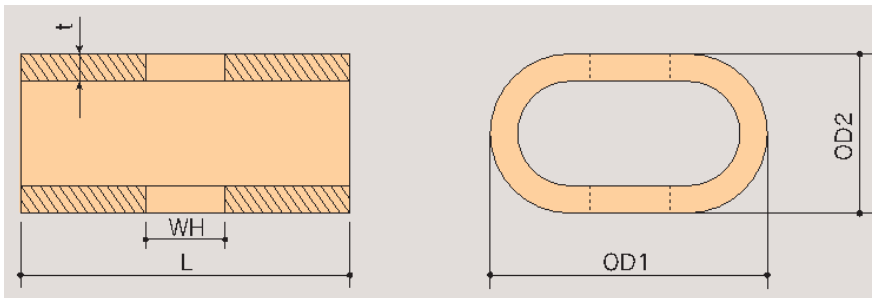
Unit: mm

Rebar size	Length "L"	Outer "OD1"	Outer "OD2"	Thickness "t"	Hole Dia. "WH"
D10	35	30	18.2	3.1	10.2
D13	40	39	24.6	4.5	10.2
D16	60	46.3	29	5	14.8
D19	70	56.5	34	6	16.8
D22	80	64.5	39	7	16.8

■ Wedge pin

Unit: mm

Rebar size	Length "L"	Diameter "D"	"L1"
D10 D13	37	10	12
D16	43	14	10
D19 D22	48	16	10



Scope of rebars to be spliced; JIS G 3112
 Grade : SD295A,SD295B,SD345
 Nominal size. : D10,D13,D16,D19
 Deformation : specified in JIS G 3112

Performance of OS Clip joint (1/3)

Monotonic tensile test of OS Clip joint in air

As the results of tensile test **in air**,

- Ultimate strength of OS Clip joint is higher than 135% of the specified yield strength of the rebar.
- Failure case is a rupture of the rebar.
- Under applied stress of about 100MPa, there tends to be softened splice-system caused by the rotation of the splice.



Specimens after tensile test

Main results of tensile test

	Specified Value	Specimen *		
		No.1	No.2	No.3
Yield strength of rebar f_y	295MPa	373MPa		
Tensile strength of rebar f_u	440MPa	522MPa		
Ultimate strength of splice f_{us}	---	512MPa	509MPa	517MPa
Ratio $f_{us} / f_y(\text{specified})$	---	1.74	1.73	1.75
Ratio $f_{us} / f_u(\text{specified})$	---	1.16	1.16	1.18
Ratio $f_{us} / f_u(\text{actual})$	---	0.98	0.98	0.99

Note * Rebar Grade; SD295A (JIS G3112)
Nominal size; D10

Performance of OS Clip joint (2/3)

Multi-cyclic bending test for RC columns

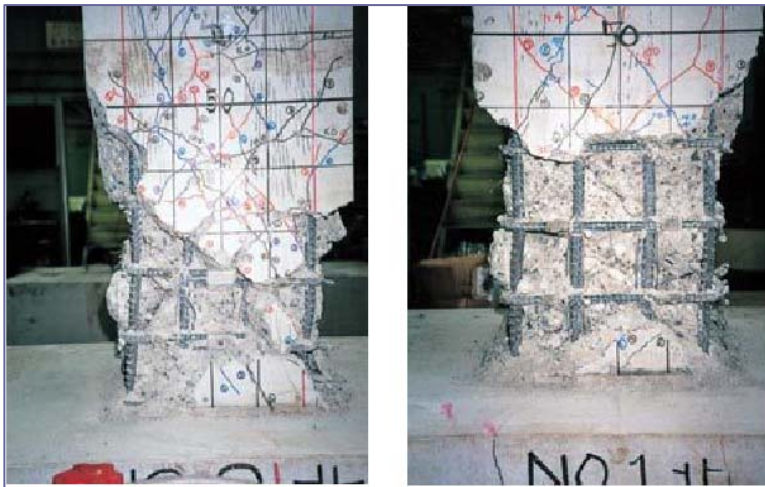
As the result of multi-cyclic bending test of RC columns;

specimen A: **hoops using OS Clip joints**

specimen B: **hoops using flare-welding splices**

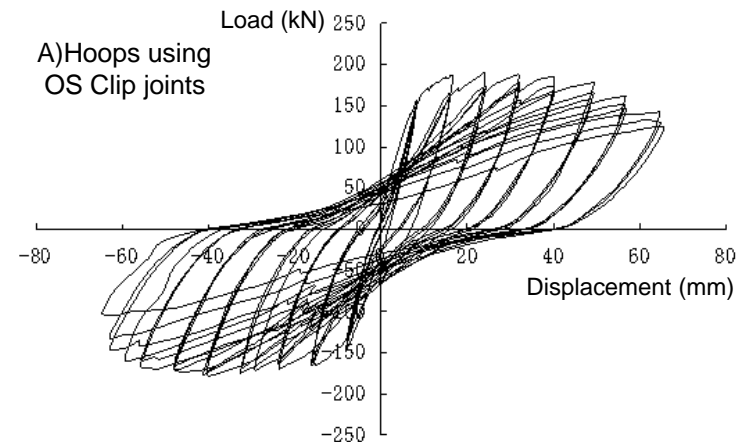
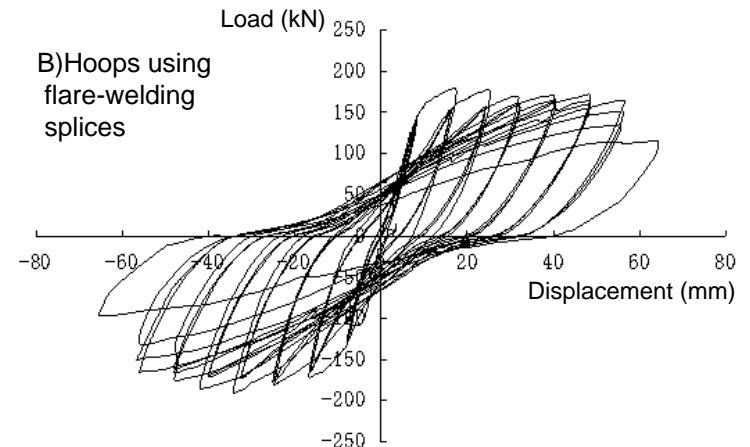
- OS clip joint eith almost equal performance with buckling-constraint of longitudinal rebars and confined
- effect of core-concrete compared with hoops using flare-welding splices.

It is expected that hoops using OS Clip joints shoe effective performance in plastic hinge area.



A) Hoops with OS Clip joints B) Hoops with flare-welding splices

Photo) Plastic hinge area after loading



Bending load – displacement relationship

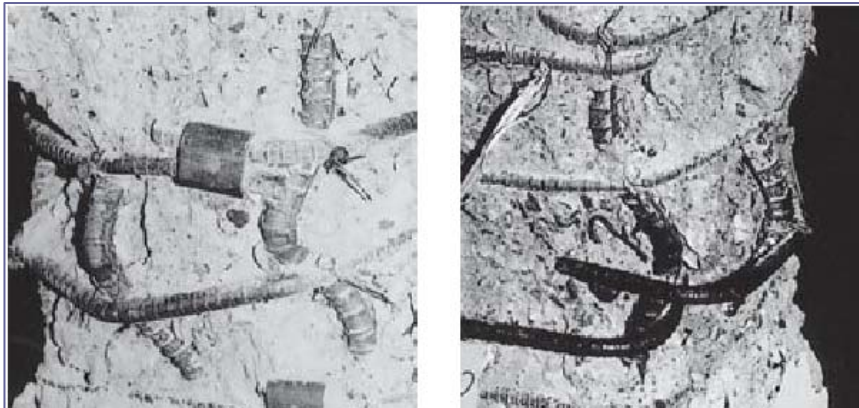
Performance of OS Clip joint (3/3)

Compressive loading test for RC short-columns

As the result of compressive loading test; Hoops of column are fabricated as follows;
 specimen A: **hoops using OS Clip joints**, specimen B: **hoops using 135deg.hooks**

- Both specimens have approximately the same maximum-strength.
- After reaching the maximum load, load-decrease of specimen A is smaller than that of specimen B, and specimen A maintained about 40% of the maximum load.
- At specimen B, 135deg.hooks were pulled out from core-concrete of the column.

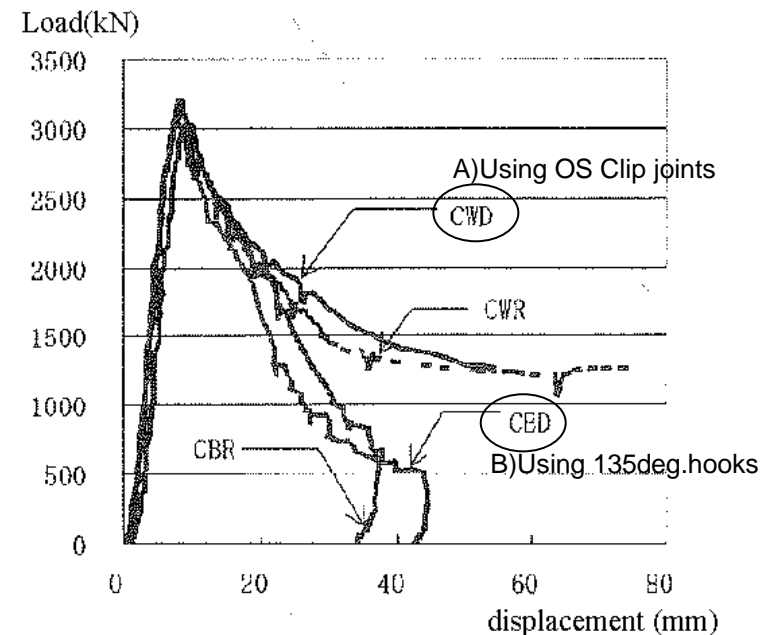
Hoops with OS Clip joints show more effective performance in the confinement of core-concrete and buckling-constraint of longitudinal rebars compared with hoops using 135deg.hooks.



A) Hoops with OS Clip joints

B) Hoops with 135deg.hooks
 *135deg.hooks were pulled out from core-concrete

Photo) Hoops and longitudinal rebars after loading



Compressive load – displacement relationship

OS Clip joint — Typical applications in Japan



Hoops for RC Column



Reinforcements for SRC beam-Column joint



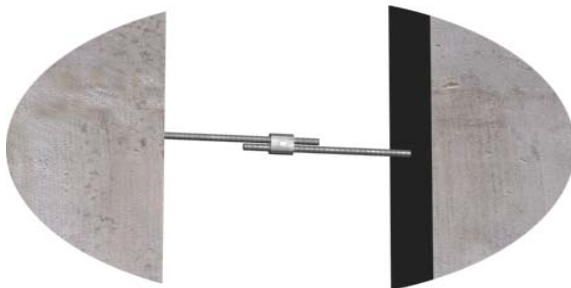
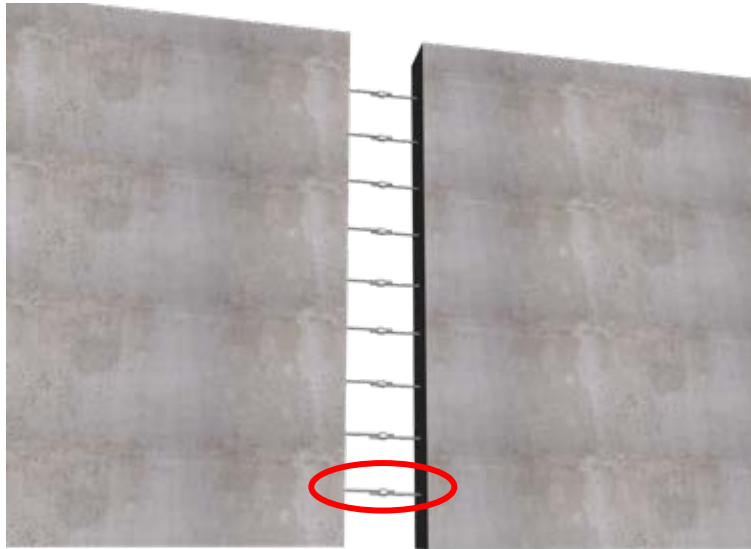
Rebar-Cage for Cast-in-place concrete pile



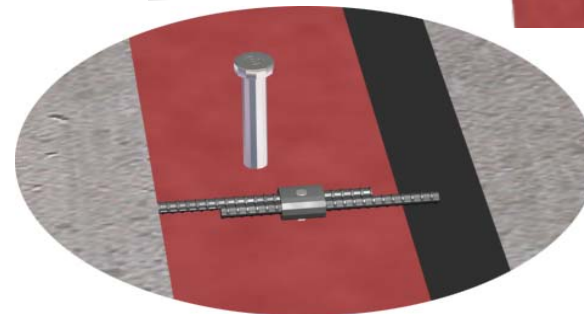
Seismic reinforcement



OS Clip joint — Typical applications in Japan



Connection for Precast-concrete walls



Connection for Precast-concrete slabs