High Corrosion Protection Steel Wire

Innovative 3E Plating Technology

ZinXperior

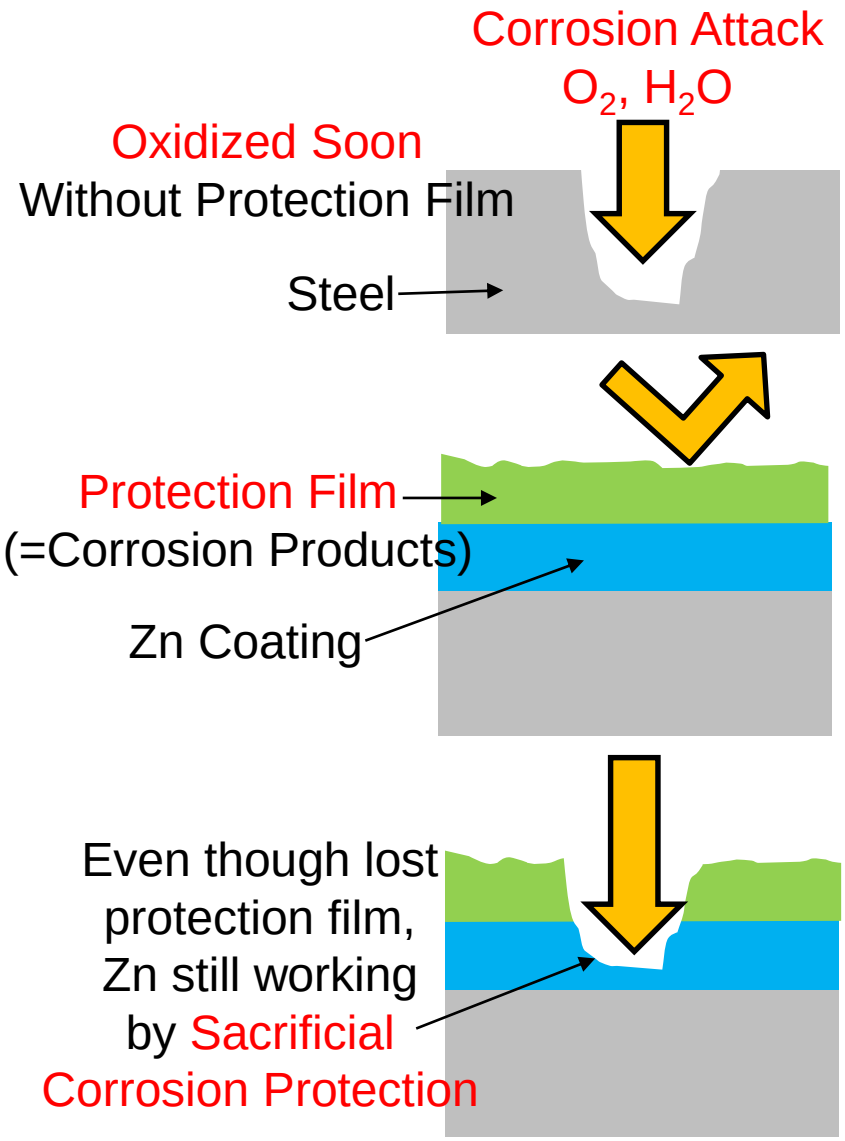
(Zinc + Superior / International T.M.)
(“Tough Guard Hard” / T.M. in Japan)

Right On The Way
Replacing All the Traditional GSW

Development Footsteps

- In 2006, 3E Plated Steel Sheet & Plate Released
  (Applied to Solar Panel, Fence, Wall etc.)
- In 2012, Specified JIS G 3323 (2012) :
  (Hot Dip Zinc-Aluminum-Magnesium Alloy Coated Steel Sheet and Strip)
- In 2014, J-witex Developed 3E HC Steel Wire
  (Hurdled difficulties in process, developed by Collaboration with NSSMC)
- In 2016, Technical Papers Released by IEEJ
  (IEEJ: The Institute of Electrical Engineers Japan)
- In 2017, Press Release with NSSMC
  (Trademark "Tough Guard Hard" in Japan)

What is *ZinXperior* ?



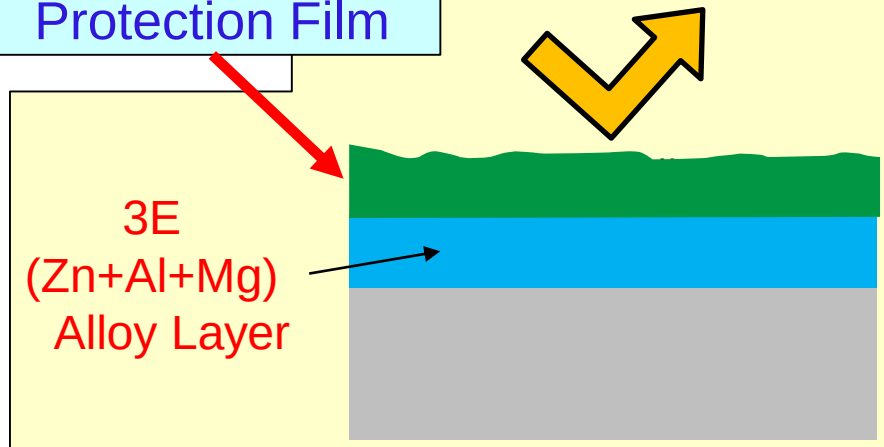
Protection Film = Corrosion Products

Cl^- $CO3^{2-}$ In the environment
Reacted⇒Basic Zinc Chloride,
Basic Zinc Carbonate, etc.

+Mg⇒Make Corrosion Products Solid
The more solid, The more protective!

Excellent Solid
Protection Film

ZinXperior

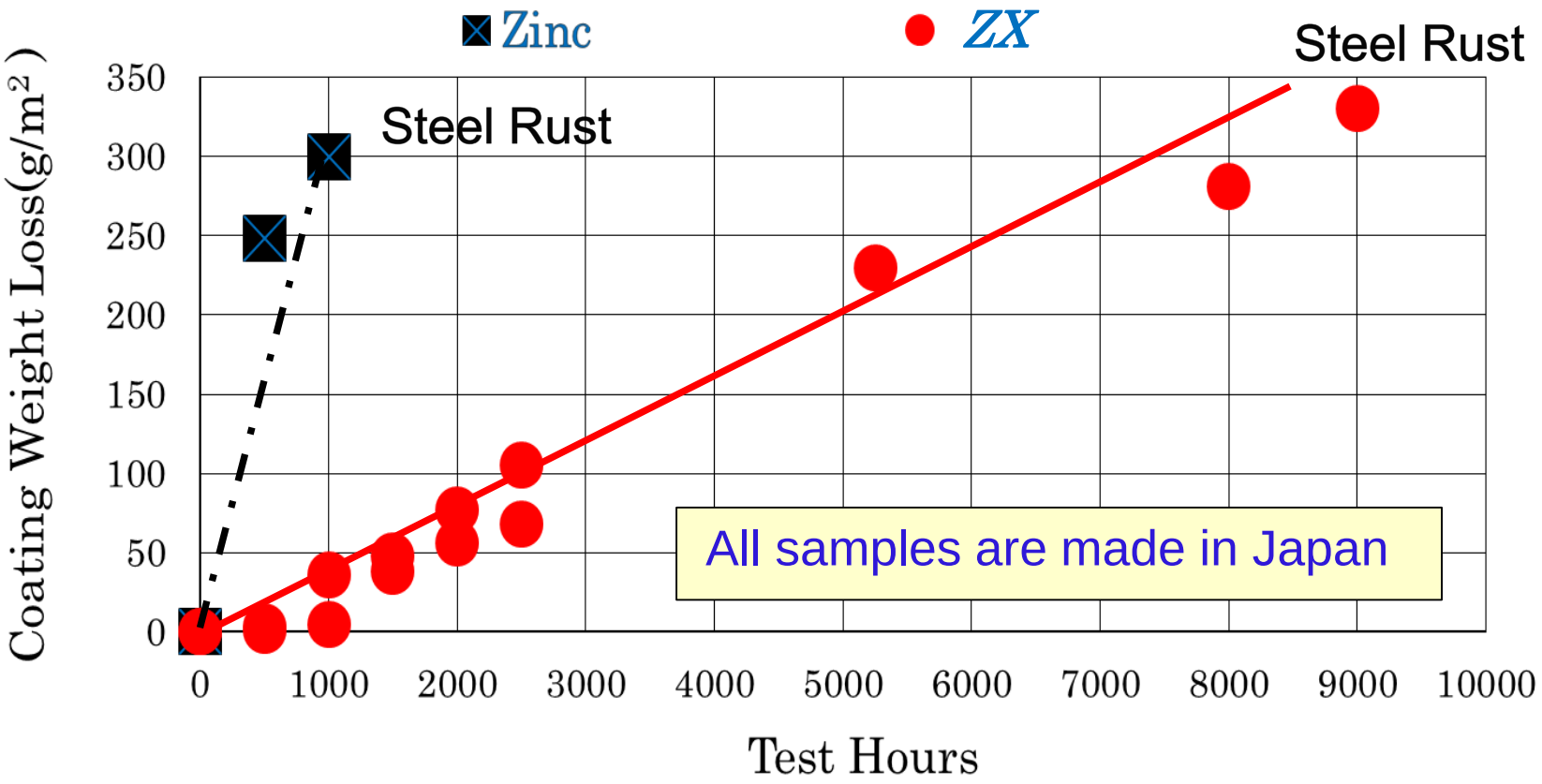


Japan + Wire + Technology + X (Dream) ⇒ J-witex

Corrosion Protection by Indoor Test

According to NSST (Neutral Salt Spray Test) 【 Wire Dia. 2.6mm】

ZinXperior(ZX) ＞ Normal Zinc : 8 times longer life

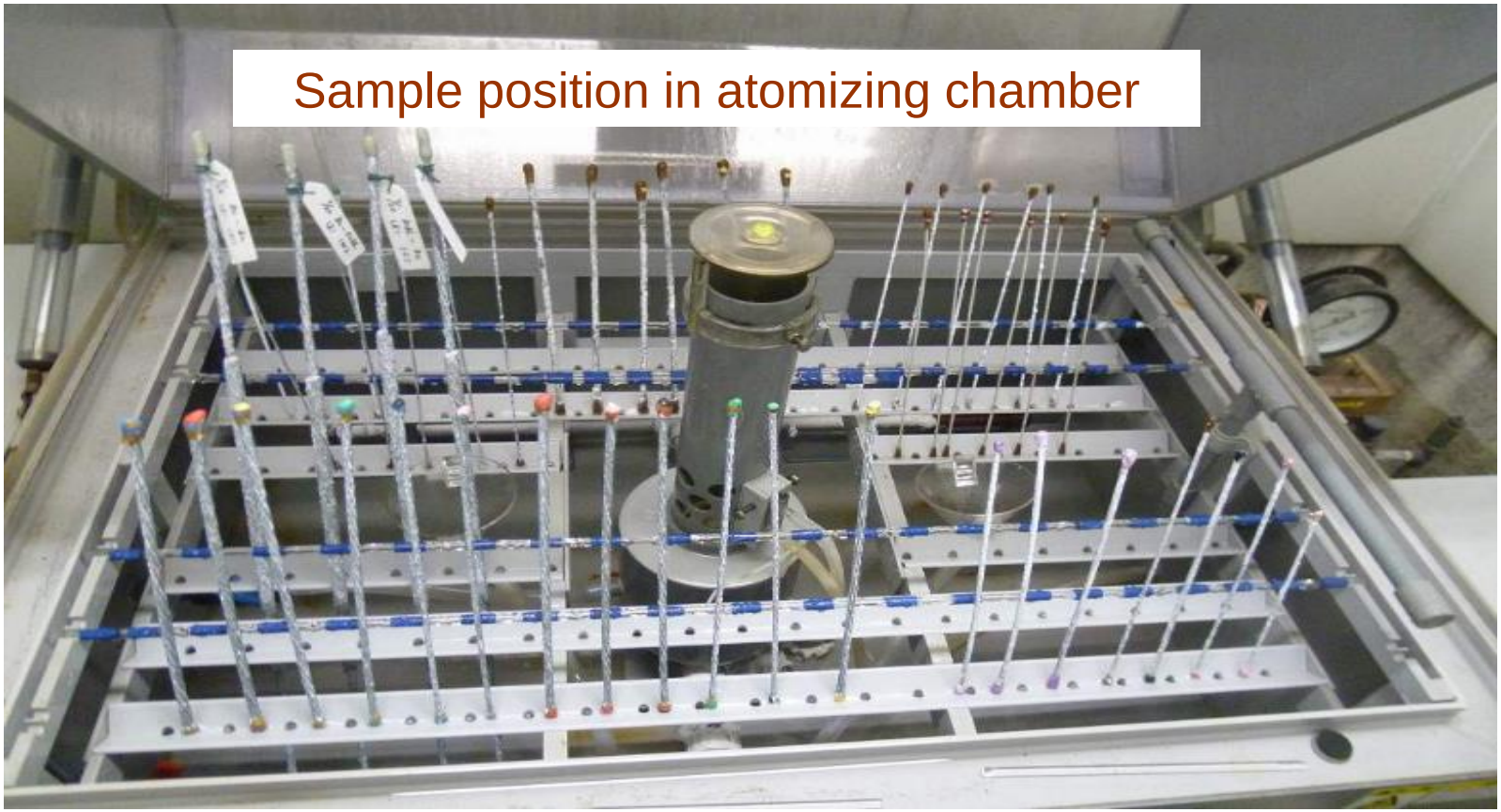


Ref.) J-witex Corp. “ Development of high corrosion resistance zinc alloy coated steel strands”
IEEJ National Convention No.7-108_2016 (in Japanese)

Inside of Chamber for NSST

Condition of SST
According to JIS Z 2371
(Corresponding to ISO 9227)

- Salt Concentration / 50±5g/ℓ
- pH / 6.5 ～ 7.2
- Temp. / 35 ±2℃



Ref.) J-witex Corp. “ Development of high corrosion resistance zinc alloy coated steel strands”
IEEJ National Convention No.7-108_2016 (in Japanese)

SST Confirmed by the 3rd Inspector

Report No. 1523470-E

Issued: Mar. 15, 2016

TEST REPORT

Messrs. J-WITEX CORPORATION

NIPPON STEEL & SUMIKIN TECHNOLOGY Co., Ltd
Hirohata Unit, 1, Fuji-Cho, Hirohata-Ku, Himeji, 671-1123, Japan
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In compliance with the request of J-Witex Corporation, this is to report the testing result of Neutral Salt Spray Test that we, Nippon Steel & Sumikin Technology Co. Ltd., carried out according to JIS Z 2371 with respect to the specimens of Anti- Corrosive Zinc Alloy Coated Steel Wire.

Keitaro Shibata
General Manager,
Material Sales Department

Surface Comparison at NSST 3,000 hours

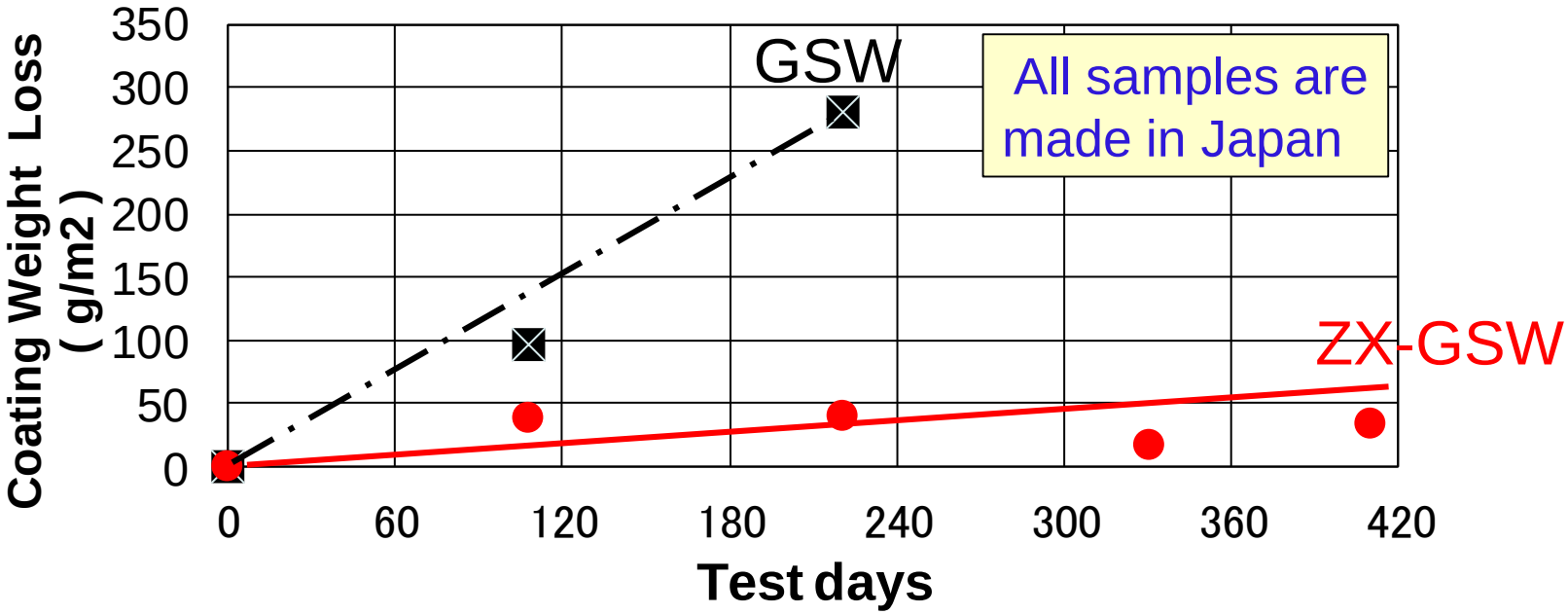
Ref.) J-witex Corp. " Development of high corrosion resistance zinc alloy coated steel strands"
IEEJ National Convention No.7-108_2016 (in Japanese)

Corrosion Protection by Exposure Test

Coating Weight Loss 【 7/ 2.6mm Strand】

- Zn Coating Weight loss ⇒ 280 g/m^2
- 3 Elements Plating Weight loss ⇒ 30~50 g/m^2

Min. 5 Times Longer Life



Ref.) J-witex Corp. " Development of high corrosion resistance zinc alloy coated steel strands"
IEEJ National Convention No.7-108_2016 (in Japanese)

Surface Comparison by Exposure Test

【 GSW 】(GSW shows red rust even after 217days)

When started
(Oct 23, 2014)

After 410 days
Red rust observed

【 ZX-GSW, ZinXperior】

When started
(Oct 23, 2014)

After 410 days
No rust observed

Ref.) J-witex Corp. " Development of high corrosion resistance zinc alloy coated steel strands"
IEEJ National Convention No.7-108_2016 (in Japanese)

Location of Exposure Test

< Subtropical Zone >

Started in Oct. 2014

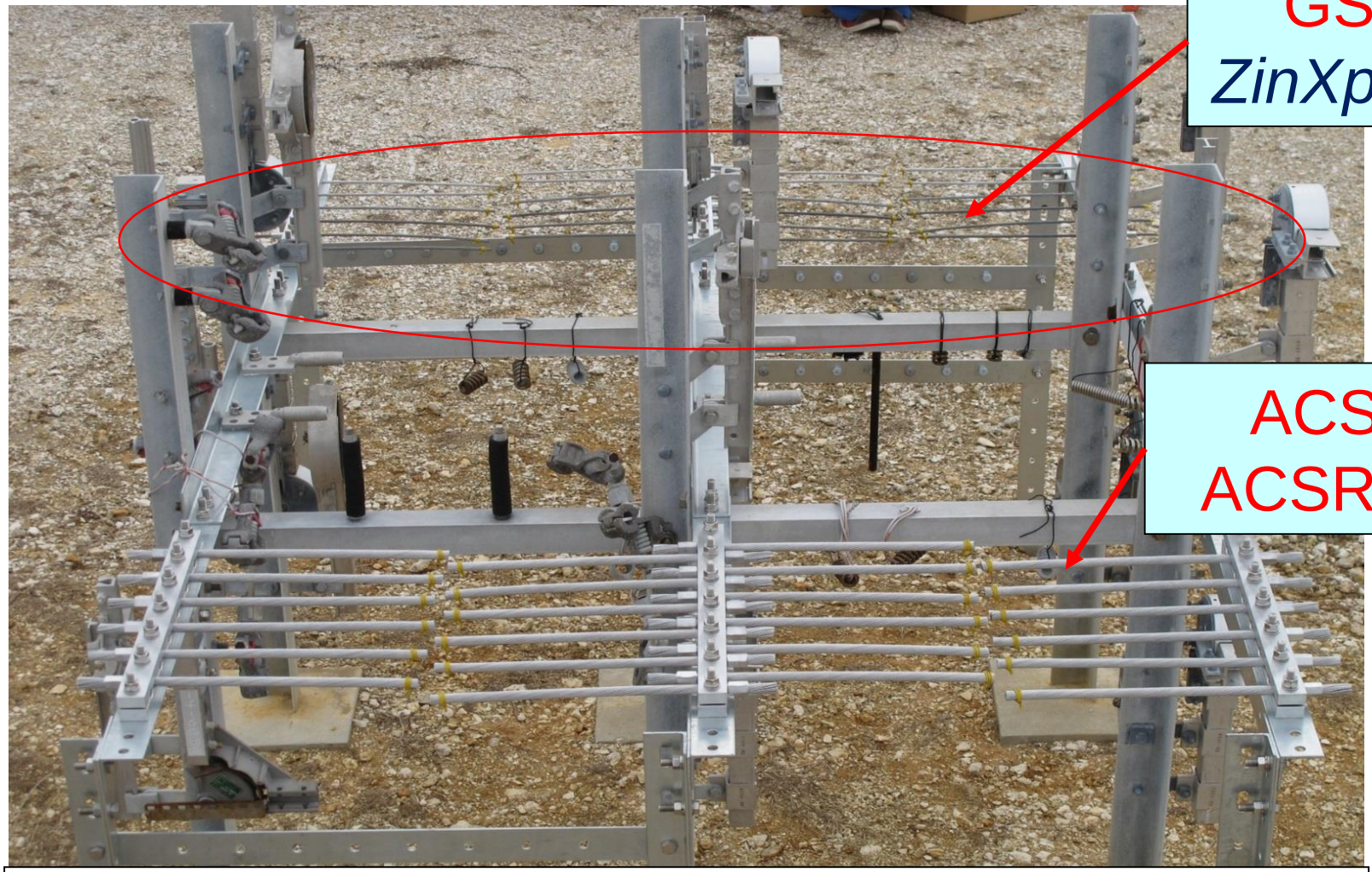
North Daitou Island

- 360km East from Main Island Okinawa
- Surrounding shore line : 15km

Ref.) J-witex Corp. " Development of high corrosion resistance zinc alloy coated steel strands"
IEEJ National Convention No.7-108_2016 (in Japanese)

Exposure Test

Samples set on Testing Rack



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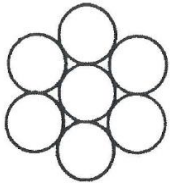
ZinXperior Mechanical Properties

J-witex

Nominal Sectional Area	Construction / Wire Dia	Min. Breaking Strength Class Ⅰ	Theoritical Sectional Area	Outer Diameter	Unit Weight
mm2	Nos/mm	kN(kgf)	mm^2	mm	kg/km
38	7/2.6	45.1（4,620）	37.16	7.8	294
45	7/2.9	56.2（5,740）	46.24	8.7	365
55	7/3.2	65.8（6,730）	56.29	9.6	445
70	7/3.5	78.7（8,060）	67.35	10.5	532
90	7/4.0	99.6（10,100）	87.99	12.0	695
110	7/4.5	126（12,800）	111.3	13.5	879

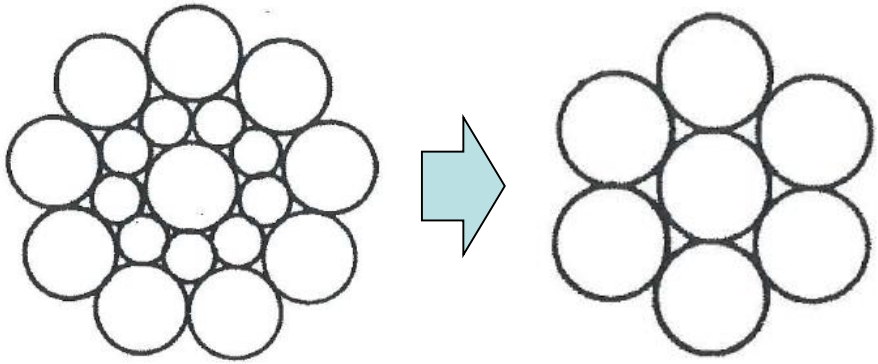


- Elastic Modulus： 205.9GPa（21,000kgf/mm2）
- Linear Expansion Coefficient：11.5×10-6/℃
- Breaking Strength depends on customer's requirement

Example/ Over Head Ground Wire

Authorized by Tohoku Power Company in 2016

(Against Lightening)
GSW = ZX(ZinXperior) >23AC >40AC



Make it possible !

Simple Design with Bigger Diameter & Reasonable Cost

Filament Melting Energy

(J/cm)

	GSW	ZX	23AC	40AC
3.2mm	610	610	490	362
3.5mm	730	730	586	433
4.0mm	953	953	765	566

$$E = \{C_{Al} \times (T_1 - T_0 + \delta_{Al}\} \times (T_2 - T_0) + \delta_{Fe}\} \times W_{Fe}$$

Standard in Japan
Summer Lightening > 380J/cm
Winter Lightening > 650J/cm
(IEEJ Report No.11379, 2016)

OHGW Type Test Approved (ZX-GSW)

平成28年10月27日

To J-witex Corp.

ジェイ-ワイテックス株式会社
代表取締役社長　石橋　靖　様

President ISHIBASHI

東北電力株式会社
執行役員　資材部長　只野　恵二

Tohoku EPCO

登　　録　　通　　知　　書

Registration Notice

貴社より申請のありました取引品目追加申請について，弊社取引品目として登録いたしますのでご通知いたします。

1. 登録期日　　平成28年10月27日

Registration Date　27 Oct. 2016

~~2. 登録番号~~

~~3. 登録期間~~

4. 登録種別(品名・規格)および内容　　Registration Articles

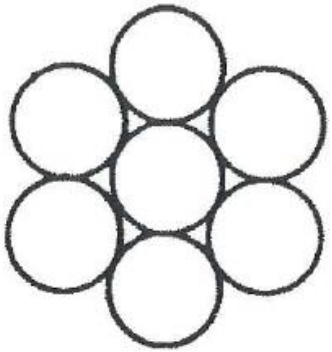
耐食亜鉛めっき鋼より線　　ZinXperior - GSW

5. ~~型式~~(物品)承認　　No. 3997

Registration No.　No. 3997

以　上

- 27 Oct. 2016
- Tohoku EPCO
  ZinXperior-GSW
  Registered for OHGW
(Over Head Ground Wire)



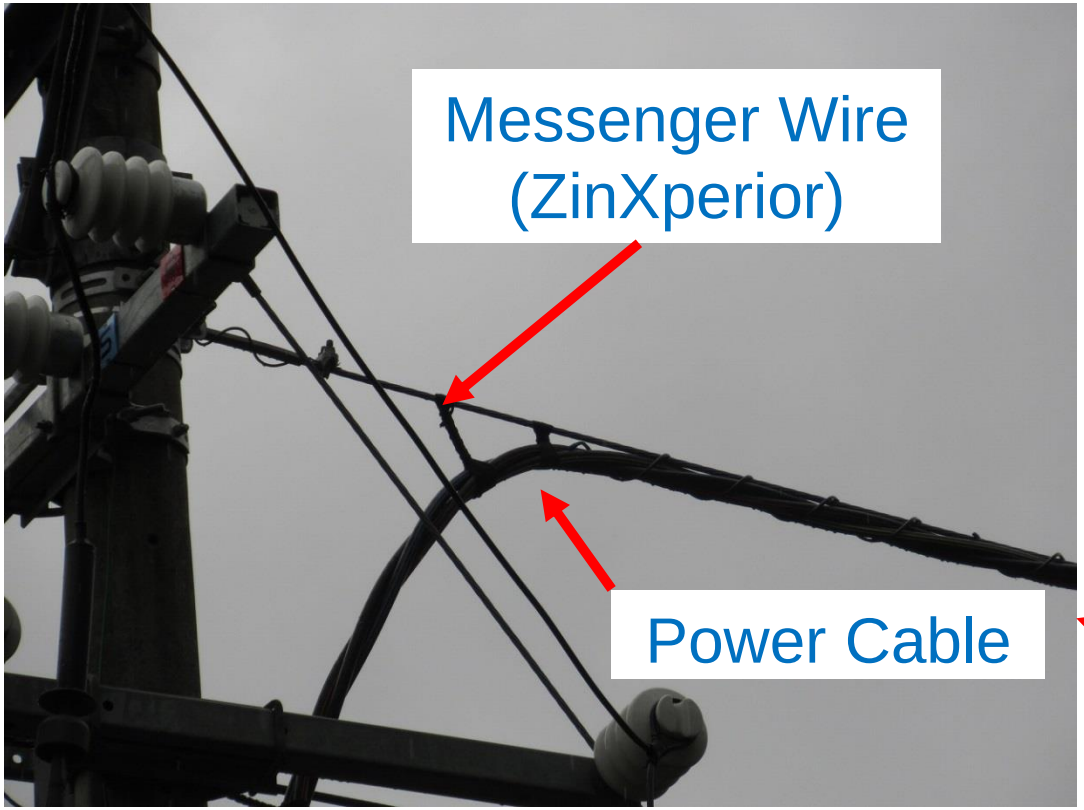
Example/Fence Protecting Sea Side Cliff

At Wakayama, Japan
Monitoring Performance
Since Dec. 2015.

Exposure Test Samples

Japan + *Wire* + *Technology* + *X (Dream)* ⇒ J-Witex

Example/ Messenger Wire



Supporting
Power Cable
on Railway
(Installed in 2016)