



2007 KOREA 10 BEST
NEW TECHNOLOGY

IPS

INNOVATIVE
PRESTRESSED
SUPPORT SYSTEM



IPS

INNOVATIVE PRESTRESSED SUPPORT SYSTEM

Greeting

Supportec Co., Ltd. had succeeded in developing the most effective and innovative soil supporting system - Innovative Prestressed Support (IPS) System - by adapting prestressing technology, which allows its wale to expand more than 20 times of its original length. IPS system significantly improves main structure and excavation efficiency that dramatically reduces the overall construction cost and time.

In regards to safety, conventional strut method fails to surface signs of collapse due to the abrupt and disastrous nature of the compressive buckling failure mode. On the contrary, IPS System shows the ductile flexural mode of large deformation before the collapse when excessive earth pressure is applied onto its wale, providing sufficient time to respond.

Furthermore, the Flexural Deformation(FD) system measures flexural deformation of IPS wale and gives warning for abnormal deformation, completely eliminating the possibility of failure. During the installation of IPS system, the prestressing procedure develops preload effects on the surrounding soil. Therefore, the system can prevent various underlying factors leading to civil complaints such as ground subsidence and buildings cracks.

Supportec Co. Ltd. promises to become a leader in construction technology and globalization of developed technology through our continuous developmental efforts in the future.

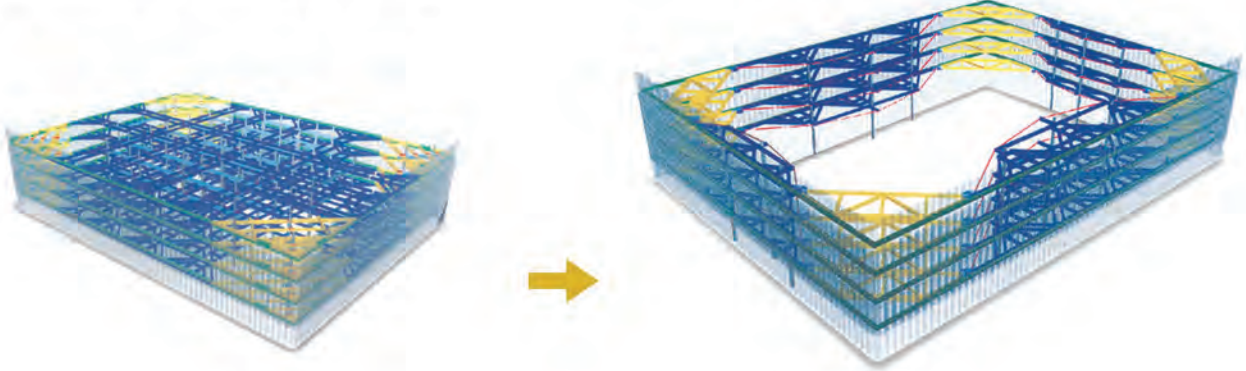
CEO, MAN-YOP HAN Ph.D

Contents

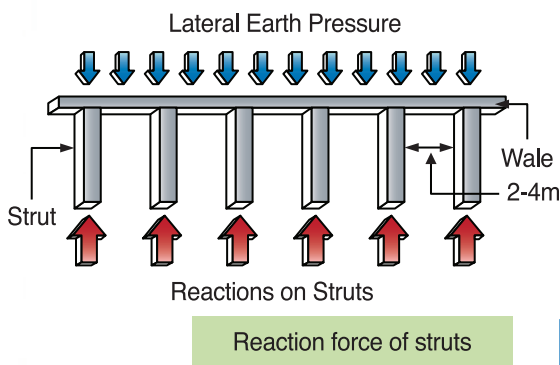
Greeting	2
Concepts and Advantages	3
Comparison	4-5
Construction Procedure	6
Type of IPS	7
Design Example	8-9
Design and Safety	10
Structural Analysis	11
Top 3 Construction Records	12-14
Patents, Licences and National Awards	15-16
Technology Transfer	17
IPS system on Media	18
Company History	19
Design and Construction Records	20

➤ Concept of IPS system

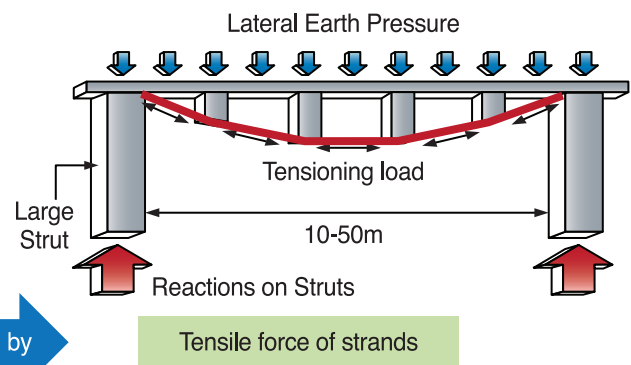
IPS System stands for "Innovative Prestressed Support System", which uses tendons and short supports to replace conventional struts and wales.



General Strut Method

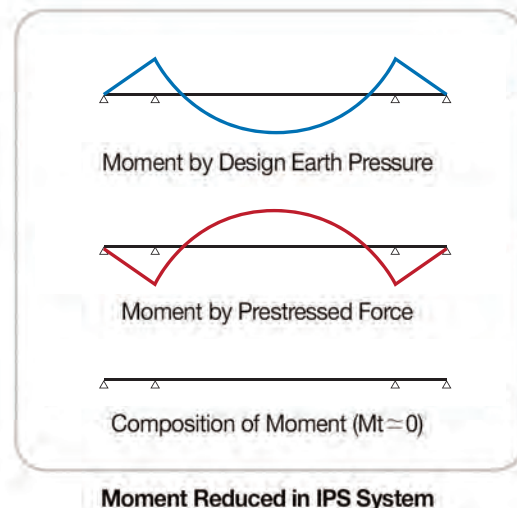


IPS Method

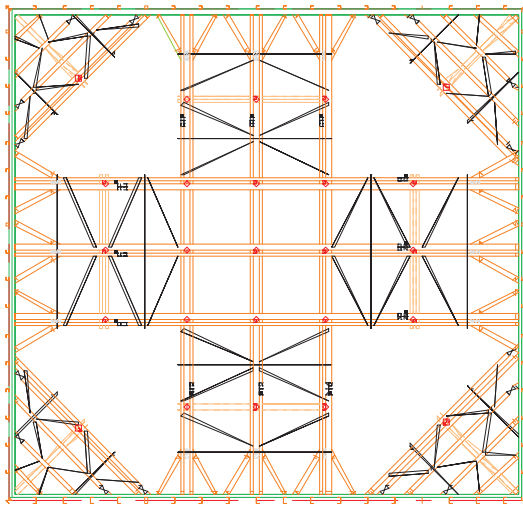


➤ Advantages of IPS system

- **Reduced steel and labor.**
- **Reduced costs of both earth retention and structure construction.**
- **Reduced periods** of both earth retention and structure construction.
- **Eco-friendly method** of excellent steel recycling rate
- **Reduction of ground deformation** by prestress effect.
- **Safety increase** via ductile flexural failure mode of IPS system
- **Easy to excavate**, to move soil out, to move materials in and to do all underground works because of the wide open space of IPS System

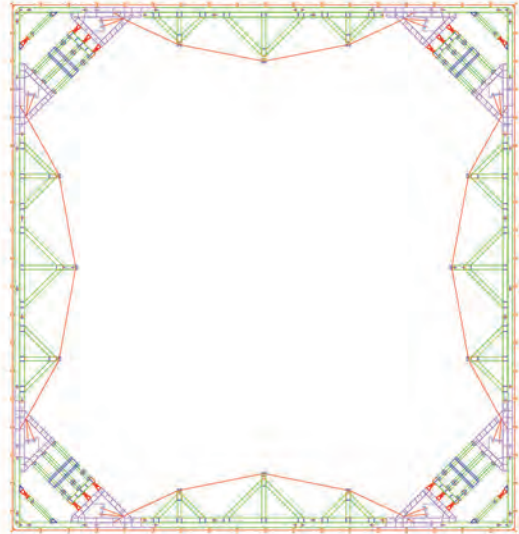


➤ Comparison of IPS system [Building Site]

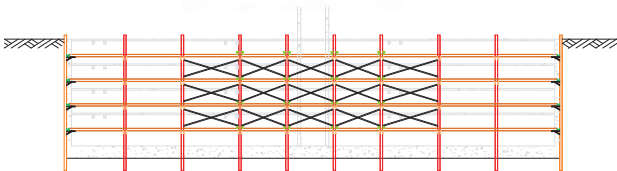


Plan View of Strut Method

VS



Plan View of IPS System



Section View of Strut Method

VS



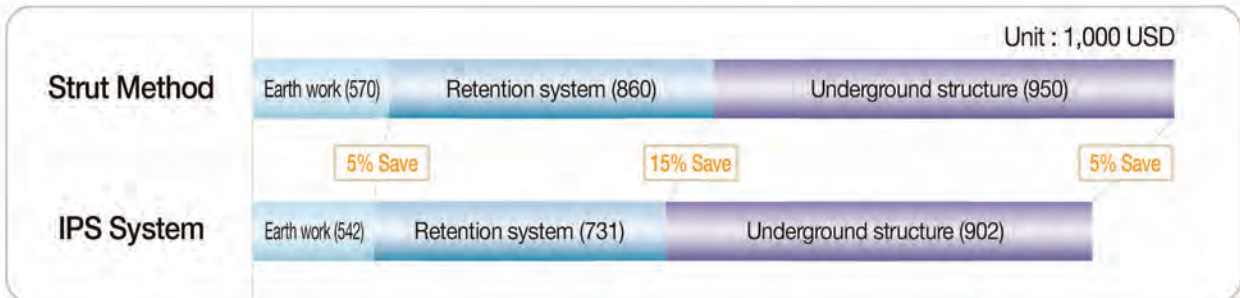
Section View of IPS System

USED STEEL

Section	STRUT Method(TON)	IPS System(TON)
H-Pile	180	180
Post-Pile	87	24
Wale	90	121
Strut	486	212
Total	843(100%)	537(63.7%)

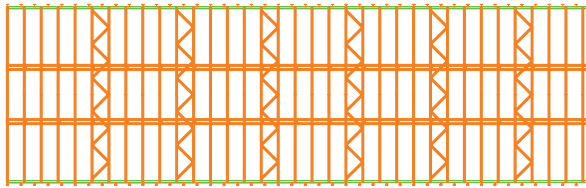
NUMBER OF JOINT

Section	STRUT Method(EA)	IPS System(EA)
Post-Pile	464	128
Wale	96	96
Strut	523	256
Bracing	188	80
Total	1,271(100%)	560(44%)



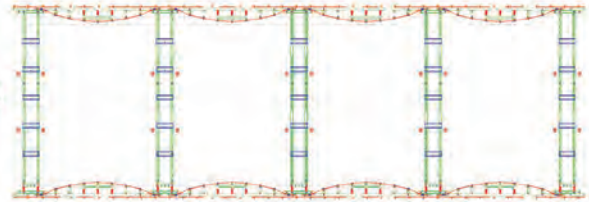
In case of building construction, the IPS system can save 36% of steel and 56% of joint, i.e. labor. IPS system can reduce the cost of earth work, retention system, and underground structure construction by 5%, 15%, and 5%, respectively. Consequently, IPS system helps to save 200 thousand USD, 8.6% of the total cost.

➤ Comparison of IPS system [Civil Site]

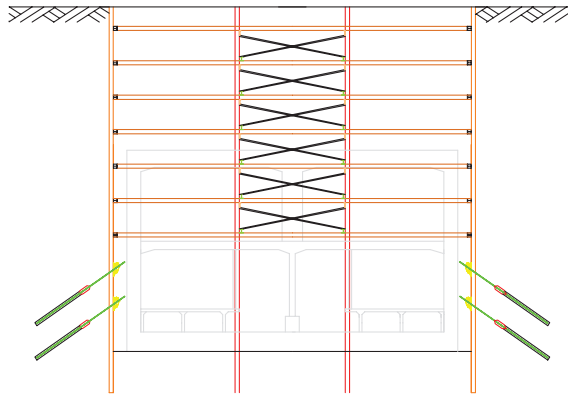


Plan View of Strut Method

VS

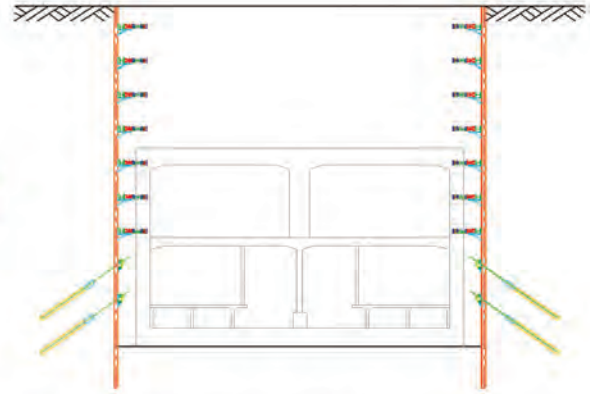


Plan View of IPS System



Section View of Strut Method

VS



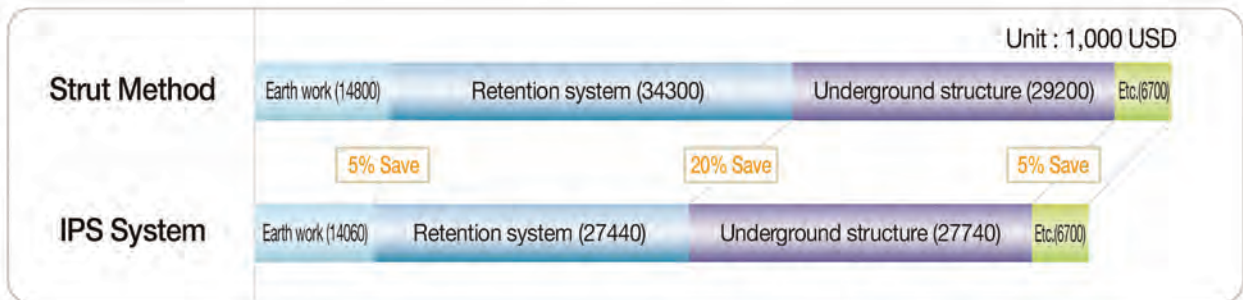
Section View of IPS System

USED STEEL

Section	STRUT Method(TON)	IPS System(TON)
H-Pile	263	263
Post-Pile	132	105
Wale	169	433
Strut	1017	42
Total	1581(100%)	843(53.3%)

NUMBER OF JOINT

Section	STRUT Method(EA)	IPS System(EA)
Post	408	220
Wale	180	978
Strut	2135	350
Bracing	735	650
Total	3458(100%)	2198(64%)



In case of subway construction, the IPS system can save 47% of steel and 56% of joint, i.e. labor. IPS system can reduce the cost of earth work, retention system, and underground structure construction by 5%, 20%, and 5%, respectively. Consequently, IPS system helps to save 9 million USD, 10.7% of the total cost.

Construction Procedure



1. Excavation and placing wale support



2. Placing the IPS wale



3. Welding the wale to H-pile



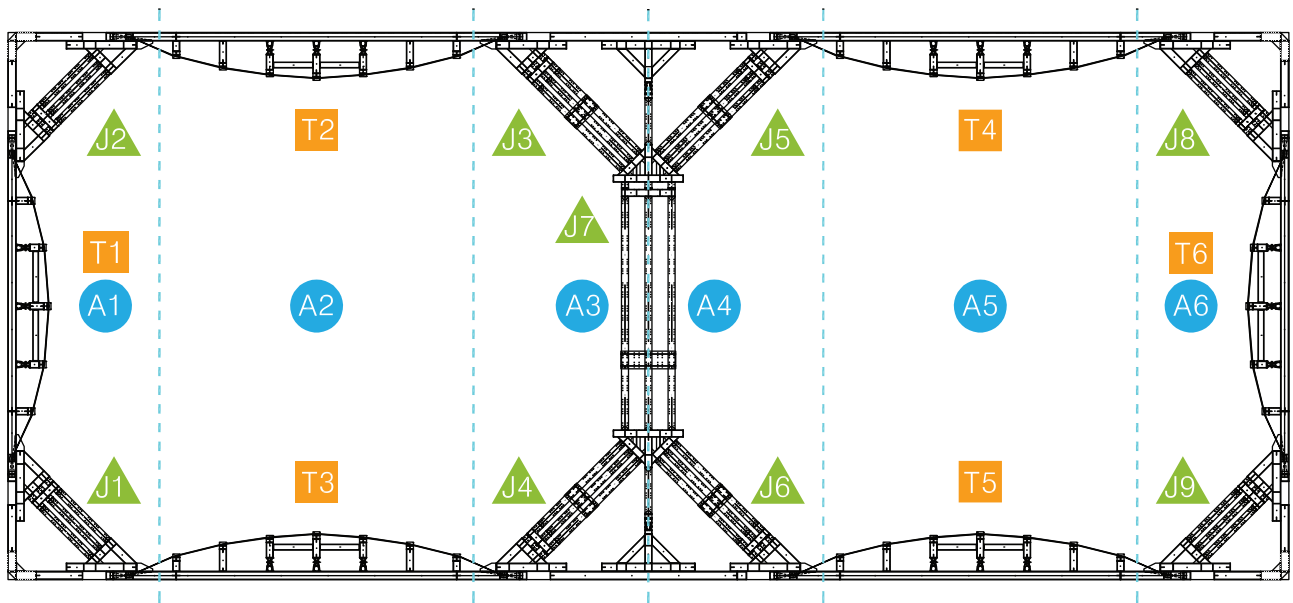
4. Placing the corner strut



5. Jacking the corner strut



6. Jacking the PC strands



→ Construction Order

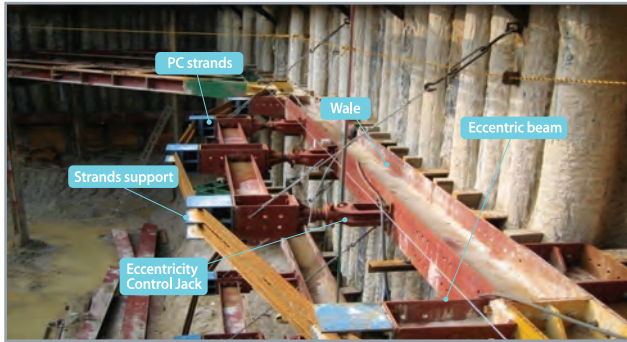
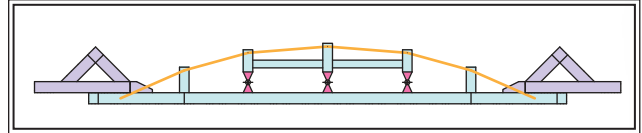
	A1	A2	A3	A4	A5	A6
Assemble	A1	A2	A3	A4	A5	A6
Jecking	J _{1,2}		J _{3,4}	J _{5,6,7}		J _{8,9}
Tensioning	T ₁		T _{2,3}			T _{4,5,6}

> Types of IPS

● Integrated wale

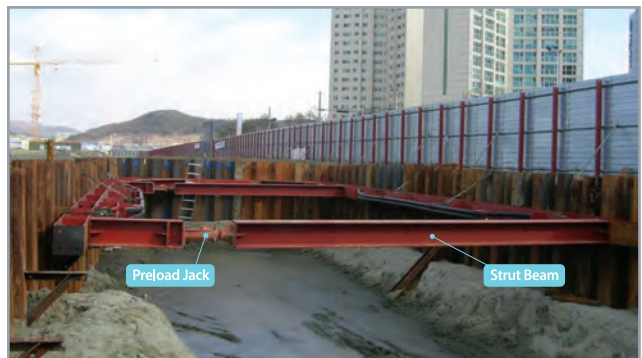
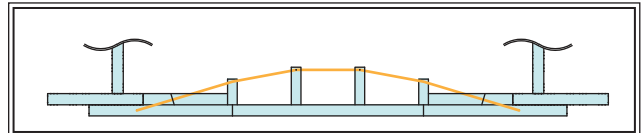
First IPS wale with Stand type (FS type)

Max. earth pressure	100 t/m
span	8~23m
Characteristic	Additional PC strands can be installed



First IPS wale with Tie-cable (FT type)

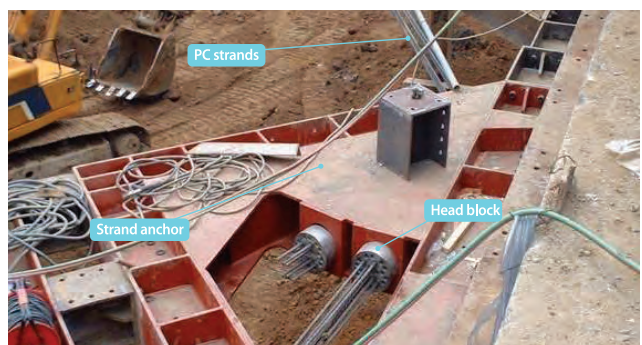
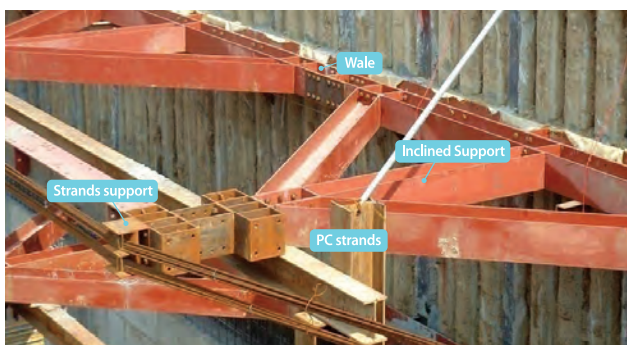
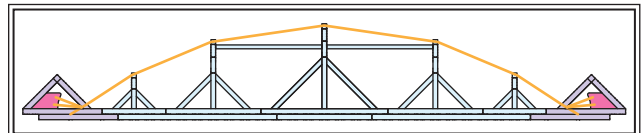
Max. earth pressure	30 t/m
span	12~18m
Characteristic	Easy assemble /disassemble (Specialized linear structure)



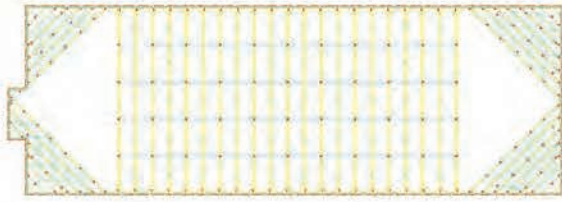
● Assembling wale

Second IPS wale with Stand (SS type)

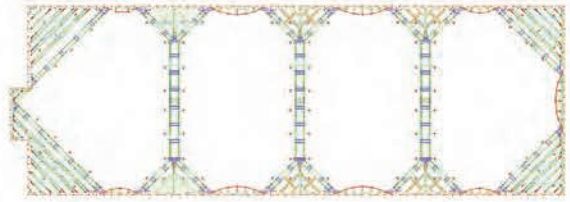
Max. earth pressure	100 t/m
span	23~50m
Characteristic	Unbalanced earth pressure can be controlled



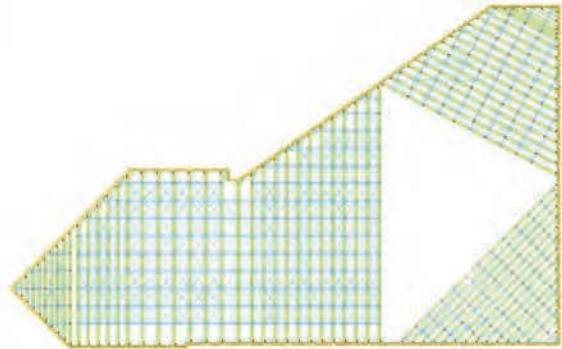
➤ Design Example [Architecture Design]



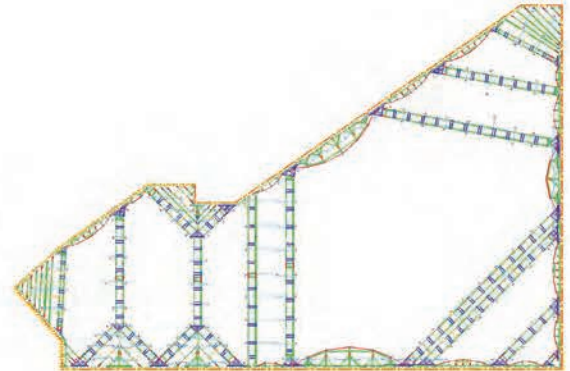
Strut system in rectangular shape



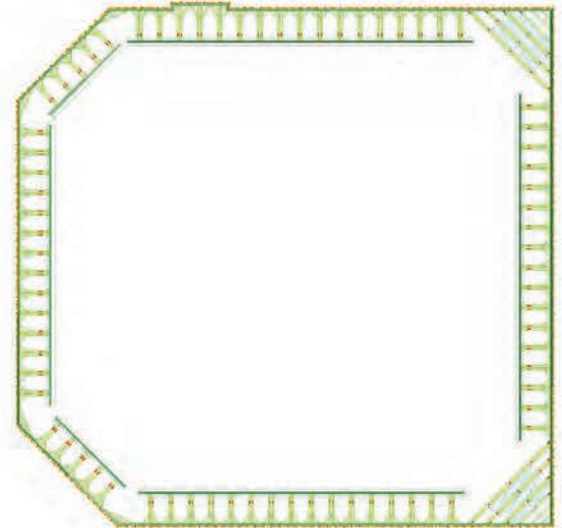
IPS system in rectangular shape



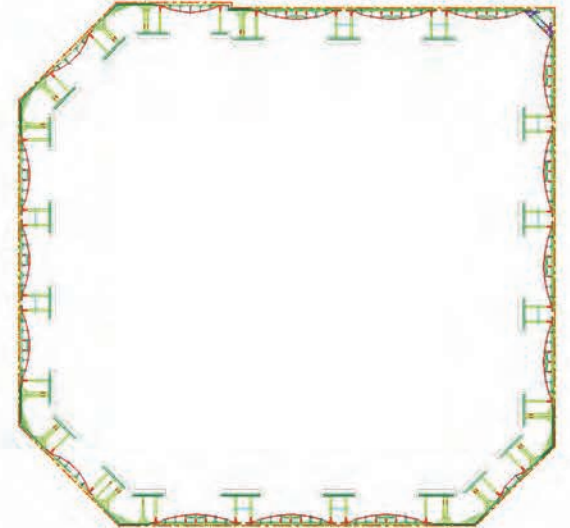
Strut system in irregular shape



IPS system in irregular shape



Conventional Raker system

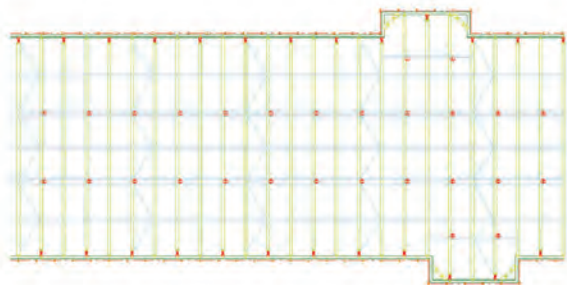


IPS Raker system for wide area

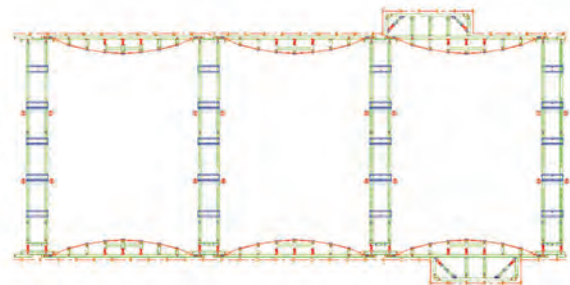
➤ IPS SYSTEM

In architectural design, the building excavation is the most representative example of IPS system application. There are application example of rectangular and irregular shape, and also application example of improved IPS Raker system for wide area.

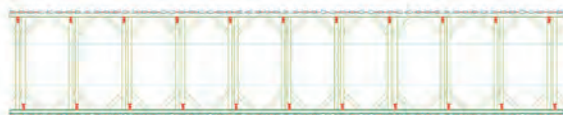
➤ Design Example [Civil Design]



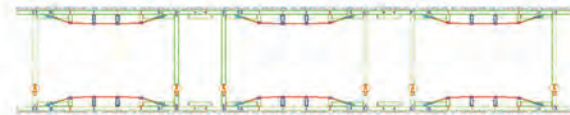
Strut system for subway



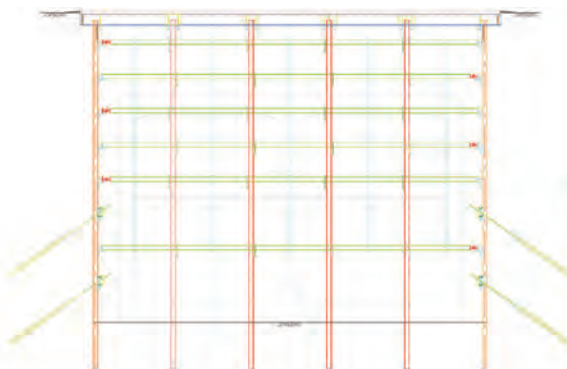
IPS system for subway



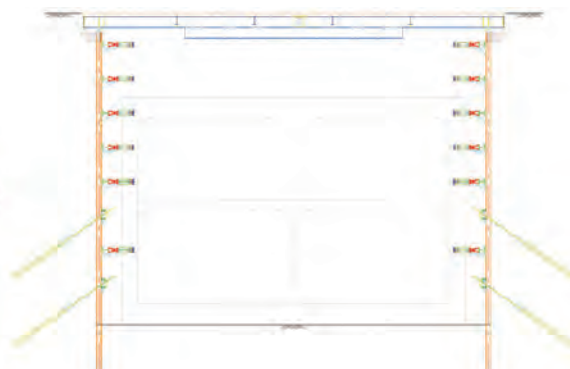
Strut system for pier



IPS system for pier



Conventional Deck system for subway



UPS Deck system for subway

➤ IPS SYSTEM

Excavations for subway, underground roadway or pier foundations are the most representative examples of the IPS system's application in civil construction. Several IPS designs such as UPS Lining for subway, for example, greatly enhanced the functional and practical aspects of the linings.

➤ Design and Safety of IPS System

Bending Moment of IPS Wale

The relationship between eccentricity and compressive force in IPS wale for the earth pressure of 10 ton/m.

Rigidity of IPS Wale

The rigidity of IPS wale is determined by span length, amount of tendon, and eccentricity.

Bending Deformation of IPS Wale

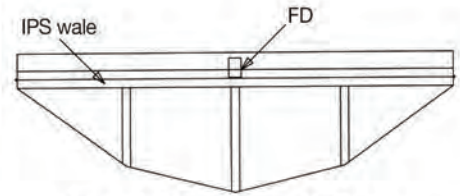
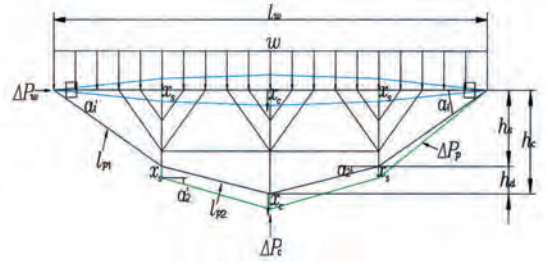
When the ground moves out by the earth pressure increases, the tensile force of tendon and the bearing capacity of IPS system increases according to the earth pressure increase. Also, additional tensioning would put the ground deformation back to normal.

Design Buckling Load of Truss Strut

Even though designed buckling load of a single strut decreases rapidly as its length increases, but the load carrying of the truss strut decreases slightly.

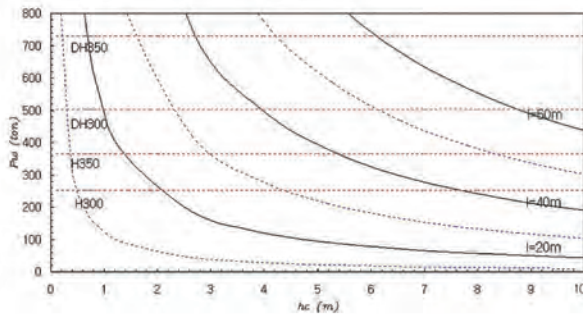
Flexible Deformation detection System

FD is a measuring and warning device that gives warning signal automatically according to the deformation of earth retention when the earth retention moves out due to overwhelming earth pressure. And it can also be applied to conventional earth retention method.

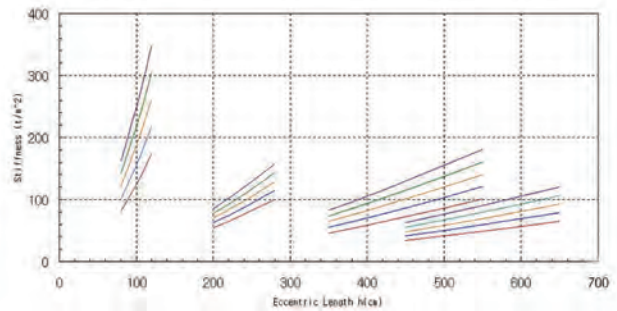


FD and safety device of IPS wale

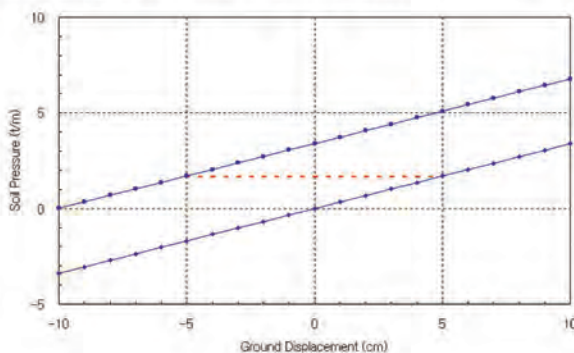
Bending Moment Diagram if IPS wale



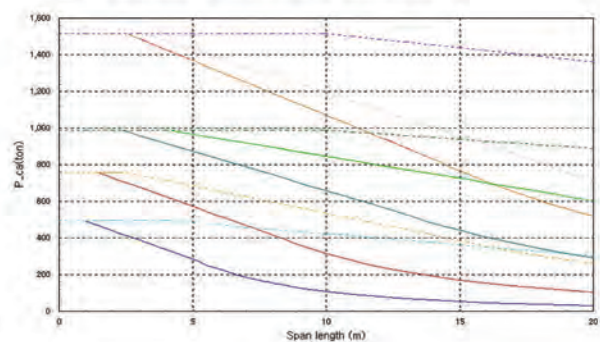
Rigidity of IPS Wale



Bending Deformation of IPS wale



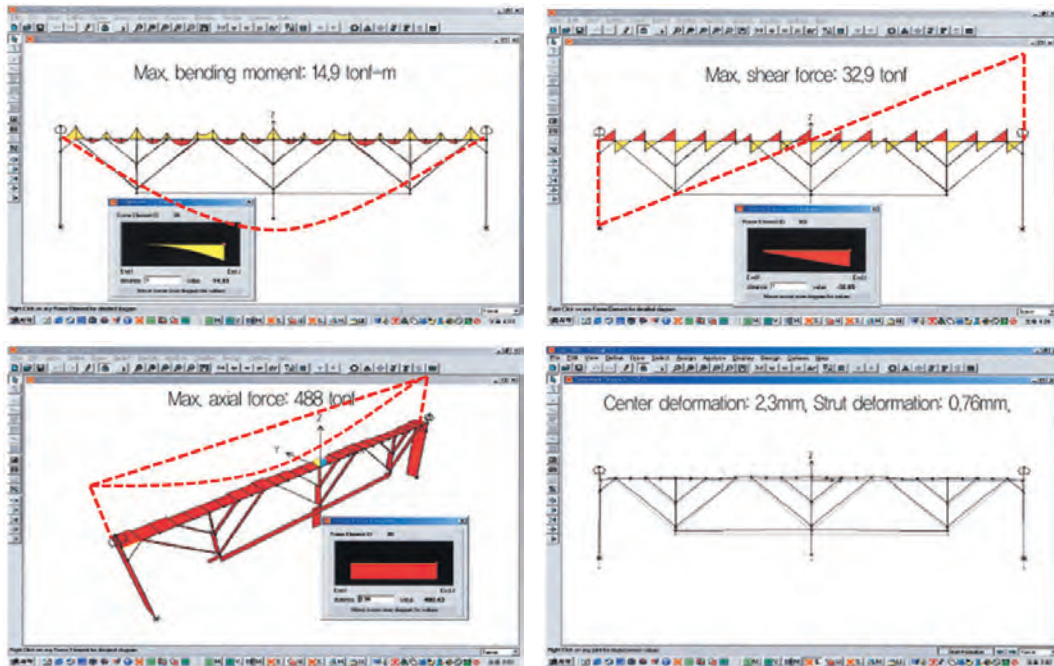
Design Buckling Load of truss strut



Structural Analysis and Safety of IPS system

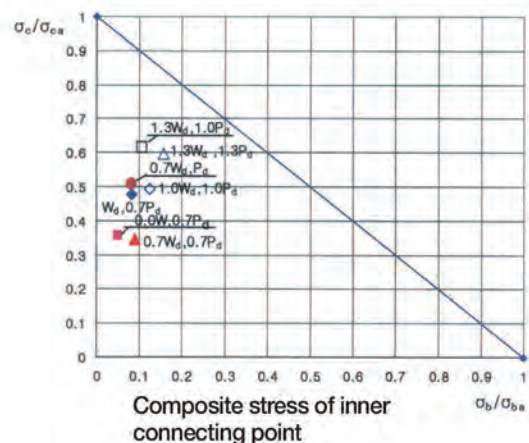
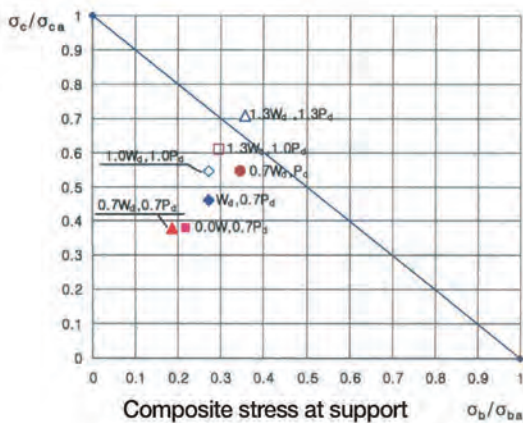
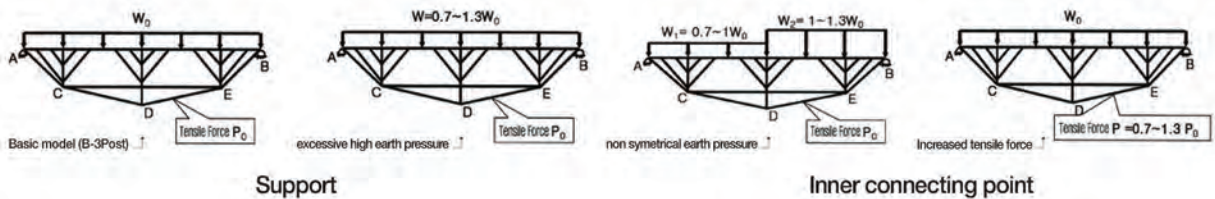
Structural Analysis

The max. moment and max. shear force depend on the distance between the support beams. Application of 30m long IPS wale reduces max. moment and max. shear by 95%, which is equivalent to almost next to no max. moment and max. shear are found on the IPS system. The IPS wale should be a double wale for supporting 488ton. The max. displacement in center is 2.3mm.

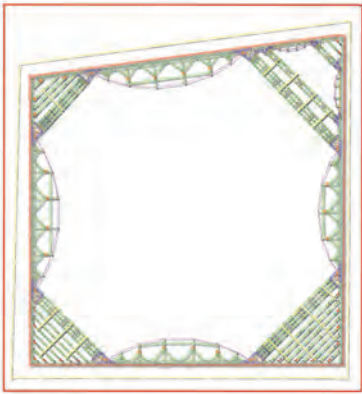


Safety Analysis

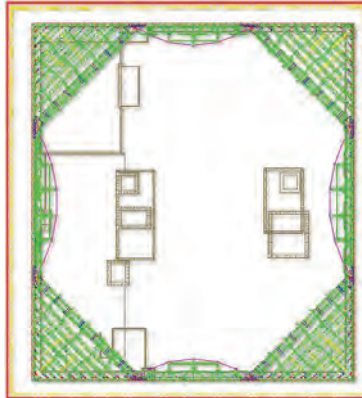
The safety of IPS system has been analyzed for abnormal cases as excessive high earth pressure, uneven earth pressure of PC tendon failure. Most of the cases are turned out to be safe except for one case, when both the earth pressure and tendon of PC tendon increases by 30%.



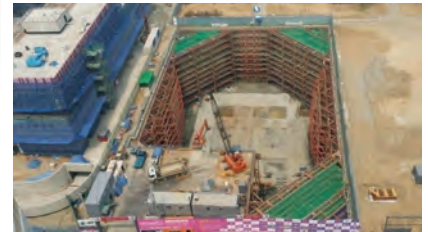
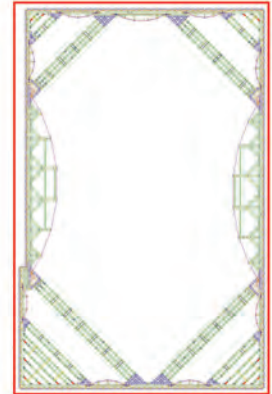
▶ Large Excavation Site



Site	Seoul - Gasan empire bldg.
GC	Korea Development
Size	75m×80m×17m
Max. earth pres.	28.3 t/m

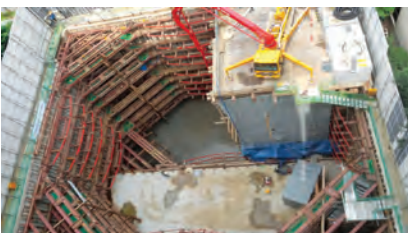
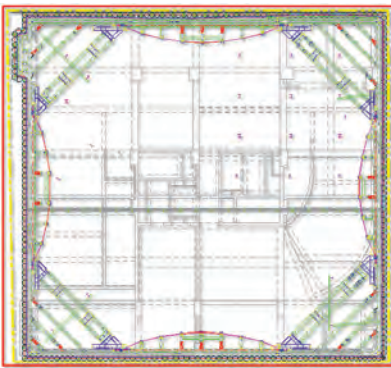


Site	Daegu - Daegu bank
GC	Hwa Sung Industrial Co.
Size	94m×85m×14m
Max. earth pres.	19.4 t/m

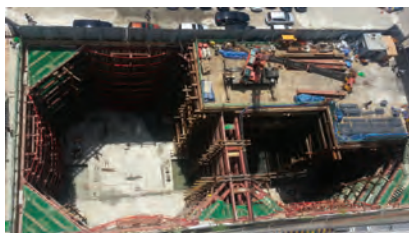
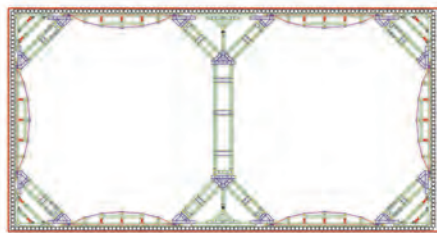


Site	Sejong - Malive building
GC	Tae han construction Co.
Size	83m×52m×25m
Max. earth pres.	28.9 t/m

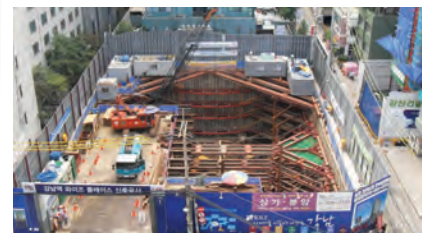
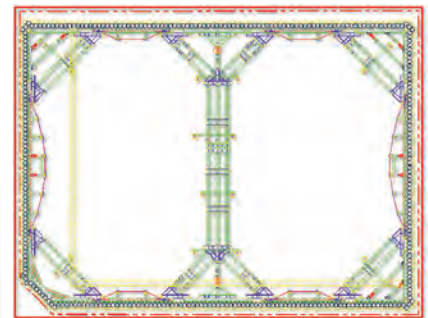
▶ Deep Excavation Site



Site	Seoul - Office in Daelim sta.
GC	Poscoplantec
Size	35m×36m×27m
Max. earth pres.	42.7 t/m

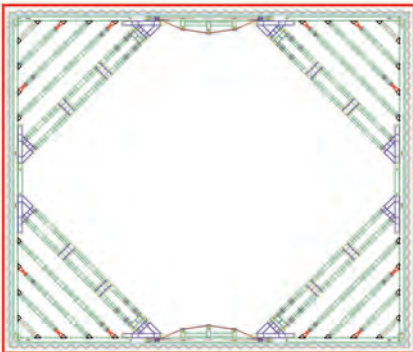


Site	Gwangmyeong - Office
GC	Dae-a Engineering & Construction Co.
Size	52m×27m×26m
Max. earth pres.	42.7 t/m

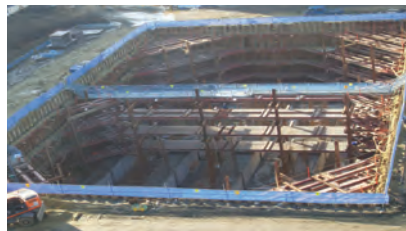
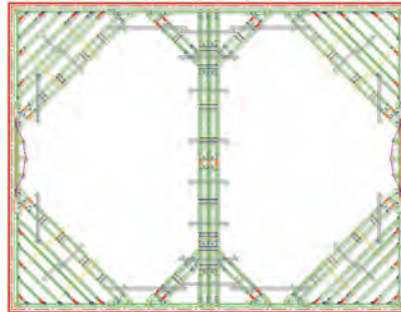


Site	Seoul - Wiseplace bldg.
GC	Shinsegae construction Co.
Size	41m×31m×30m
Max. earth pres.	31.6 t/m

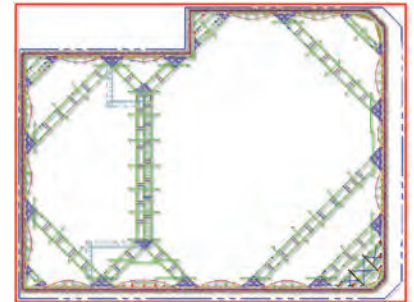
➤ Soft Ground Excavation Site



Site	Gimpo - Pier in Han-river rd.
GC	Hyundai construction co.
Size	31m x 26m x 25m
Max. earth pres.	88.9 t/m



Site	Kusan - CWP Sec. of Fire power plant
GC	Samsung C&T co.
Size	52m x 33m x 14m
Max. earth pres.	61.8 t/m

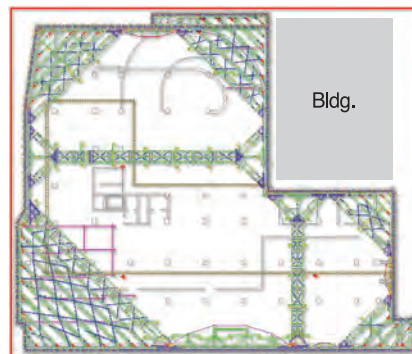


Site	Ilsan - Office in Baekseok-dong
GC	Chin Hung international inc.
Size	78m x 60m x 19m
Max. earth pres.	67.9 t/m

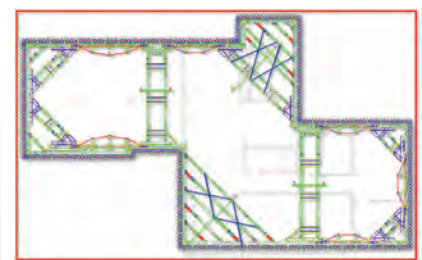
➤ Irregular Excavation Site



Site	Lotte Castle Apt in Geoje
GC	Lotte construction co.
Size	151m x 101m x 17m
Max. earth pres.	17.2 t/m

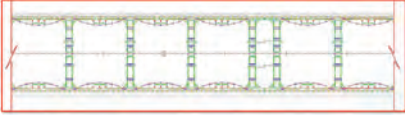


Site	Seoul - Sejong university dorm
GC	Bomi construction co.
Size	72m x 62m x 21m
Max. earth pres.	29.5 t/m



Site	Seoul - Office in Guro
GC	Hyundai BS&C co.
Size	45m x 28m x 12m
Max. earth pres.	12.5 t/m

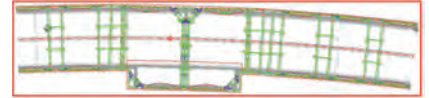
Underground Roadway



Site	Cheongju - Underground rd.
GC	Dongsan construction co.
Size	716m×19m×11m
Max. earth pres.	29.2 t/m



Site	Gwangju - Underground rd.
GC	Hyundai construction co.
Size	800m×25m×10m
Max. earth pres.	18.1 t/m



Site	Hwaseong - Underground rd.
GC	Hyundai construction co.
Size	360m×22m×11m
Max. earth pres.	21.8 t/m

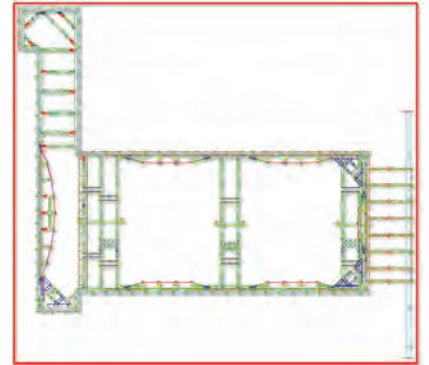
Plant Excavation Site



Site	Tae'an - Fire power plant
GC	Sk construction co.
Size	650m×18m×10m
Max. earth pres.	39.7 t/m



Site	Kunsan - Waterline Sec. of Fire power plant
GC	Samsung C&T co.
Size	203m×12m×7m
Max. earth pres.	25.8 t/m



Site	Incheon - Pump facility in Incheon complex 3 power plant
GC	Kumgo construction co.
Size	35m×17m×5m
Max. earth pres.	32.1 t/m

Patents, Licences and National Awards

Patents and Licences

The IPS system received 16 domestic patents and 17 additional patents are currently pending. Furthermore, IPS received foreign patents from countries like United States, Japan, China, and India along with additional 7 patents currently pending in PCT and in other 5 countries.

Domestic Patents



Foreign Patents



Prize and Certification

IPS system got New Excellent Technology Certificate and many medal for merit and technology prize.



No.	Date	Prize	Awarder
1	2004. 11. 03	New Excellent Technology Certificate (No.433)	Ministry of construction & Transportati on
2	2006. 04. 21	Letter of Commendation	Ministry of Science and Technology
3	2007. 07. 23	IR52 Jang Young Sil Award	Ministry of Science and Technology
4	2007. 12. 24	2007 Korea 10 Best New Technology Prize	Ministry of Commerce, Industry & Energy
5	2007. 12. 24	2007 Korea 10 Best New Technology Certificate	Ministry of Commerce, Industry & Energy
6	2008. 04. 18	INNOBIZ (Certification system ver.3)	Small and Medium Business Administrati on
7	2008. 12. 18	2008 The Best Patent Products Prize (The First Prize)	Korean Intellectual Office
8	2009. 04. 22	20th year New Construction Technology, Minister of Construction and Transportati on Prize	Ministry of Construction and Transportati on
9	2009. 11. 05	2009 Practical Usage of New Technology Prize	Prime Minister

▶ Technology Export of IPS system

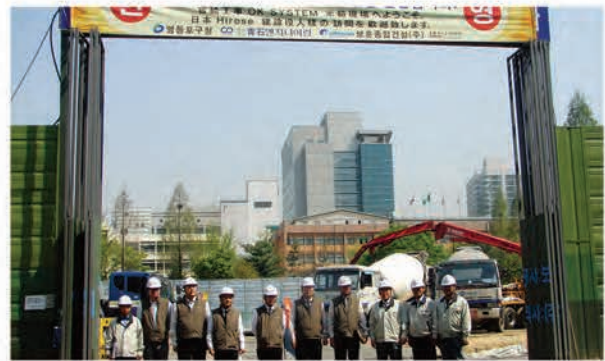
S Company (China) - Export the IPS technology



L Company (USA) - Technology briefing / IPS system site tour



H Company (Japan) - Technology briefing / IPS system site tour



Agencies, Consultants, Contractors (Singapore) - Technology briefing / IPS system site tour



➤ History of IPS System

2013~2015	<ul style="list-style-type: none"> • Registered Platinum Member by ACF • Research Fund awarded from Korea Land & Housing Corporation • Registered Partner with Hanyang Construction Co., Paradise Global Construction Co., Daebo Construction Co. and others • Registered Partner with Hyundai Construction Co. Handai Engineering Co. Hyosung Construction Co. Daelim Construction Co., Shinsegae-EnC and others
2010~2012	<ul style="list-style-type: none"> • Technical Seminar for IPS technology in Beijing China • Technical Seminer for IPS technology in Malaysia and Thailand • Technical Seminer for IPS technology in Hangzhou and Gwangju, China • Participation in the CIVIL EXPO • Research Funded by Ministry of Land, Transport and Maritime Affairs “Medium size standing earth retaining method” • Export the IPS technology to China
2007~2009	<ul style="list-style-type: none"> • Awarded “The Korea Construction New Technology” by Ministry of Land and Ocean • Appointed as Promising Small Company by Industrial Bank of Korea • Prime Minister Prize for Practical usage of the Best Technology, 2009. • Total Capital increased to 5 Million USD • The Most Excellent Prize, Commissioner’s Award by the Korean Intellectual Property Office • Sign MOU/NDA with US and Japan construction companies • Awarded IR52 Jang Young-Shil Prize by Ministry of Technology • Awarded Investment from Korea Development Bank • Designated as The Korea's 10 Best Technology, • Awarded Silver Prize as an Advanced technology by Ministry of Commerce, Industry and Energy
2003~2006	<ul style="list-style-type: none"> • Award by Korea New Construction Technology Association • Awarded an Advanced Construction technology by Ministry of Science & Technology “NET K054” • Recieving a Minister Award by Ministry of Science and Technology on the 39th Science Day • Certified as Korea Venture Company • Patent registered "Wide range warning system" • Supportec Co. Research Institute established. • The 1st Commercial IPS site started (Commercial Bldg.) • Awarded as an Advanced Construction Technology by Ministry of Construction and Transportation (No.433) • Awarded as an Advanced Construction Technology by Ministry of Science & Technology (KT 1636) • Supportec Co. Ltd was found. • The 1st test IPS site started (Sewage Line)

> Design Record of IPS system

	Detailed type	Market Size (2015, Mil USD)	Achievement													Total
			2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Civil	Railway & Subway	85,850	4	14	6	7	2	6	14	9	1	0	1	18	4	86
	Road & Bridge	9,812	1	21	26	15	17	53	22	43	13	4	0	1	0	216
	Water supply & Drainage	18,658	0	6	9	6	5	9	12	9	14	6	5	2	1	84
	ETC.	131,583	4	4	4	4	2	7	3	1	0	18	7	8	1	61
	Subtotal	245,902	9	45	45	32	26	43	51	62	28	28	13	29	6	419
Buildings	House	530,242	8	14	16	20	28	7	2	6	31	50	36	37	44	299
	Office	137,323	20	54	50	45	40	28	37	28	34	20	20	25	34	435
	Government	40,698	0	11	20	24	25	15	27	10	19	8	5	5	1	170
	ETC.	96,723	1	1	4	17	7	5	5	30	3	12	11	3	9	107
	Subtotal	804,985	29	80	90	105	100	53	71	74	87	90	72	70	88	1009
Total		1,050,888	38	125	135	137	126	96	122	136	115	118	85	99	94	1426

> Construction Records of IPS system

NO	Year	Construction Site	Construction	Size(m)	Material (ton)	Earth Pressure (t/m)
1	2003	Sewage Line in Chunan	POSCO Co	23 X 7 X 8	54	23
2	"	Bega-town Bldg. in Anyang	Sebang Co	48 X 43 X 12	368	10
3	"	New harbor road Brdg in Busan	Daewoo Co	12 X 12 X 5	24	31
1	2004	Hundai hometown	Hyundai Co	166 X 5 X 13	34	15
2	"	Subway station 914 in Seoul	Doosan Co	28 X 8 X 4	40	20
3	"	KT&G Complex Bldg. in Busan	Daewoo Co	52 X 29 X 17	590	40
4	"	Drainage Facility of Macdo-River	Dongsung Co	60 X 47 X 7	287	15
5	"	KT&G Complex Bldg. in Suwon	Poonglim Co	39 X 37 X 19	503	18
6	"	Acro-Tower Bldg in Daegu	Daelim Co	82 X 68 X 17	1030	16
7	"	Ihwa-Apt. in Incheon	Sindongah Co	136 X 10 X 13	176	13
1	2005	ACE Tower Bldg in Seoul	Dongyang E&C	31 X 26 X 16	344	22
2	"	Juan-KNHC Apt. in Incheon	Poonglim Co	166 X 10 X 10	64	7
3	"	Pumping Plant in Galmal	Dongseo Co	33 X 12 X 13	43	24
4	"	Sports-center in Uijongbu	Grasstech Co	86 X 64 X 17	1538	15
5	"	Pier of Gaduck Brdg. in Busan	Ssanayong E&C	37 X 16 X 24	1224	20
6	"	Chamsil-Apt. in Seoul	Samsung Co	69 X 9 X 15	121	14
7	"	E-MART in Asan	Shinsegae Co	97 X 86 X 12	215	13
8	"	Apt. in Buchon	Daewoo Co	195 X 10 X 13	157	15
1	2006	National possession real estate dev in Seoul	Daewoo Co	41 X 60 X 17	701	15
2	"	Reconstruction of Ponam Brdg	Samsung Industry	20 X 13 X 11	103	20
3	"	A Branch office Bldg. in Yeosu	Ilisan Co	61 X 46 X 6	152	9
4	"	Riverside Apt. in Daegu	Kolon Co	140 X 100 X 9	583	11
5	"	Post office Bldg in Namyangju	Shindongah Co	54 X 50 X 11	519	24
6	"	Reconstruction of Kimhae Brdg	Doungbu Co	90 X 6 X 11	119	39
7	"	3-2 Sec. Apt. in Junnong-Dong	Samsung C&T	107 X 9 X 12	120	9
8	"	Bulam Underpass	Dongbu Co	46 X 31 X 5	100	17
9	"	Subway station 754 in Seoul	Daewoo Co	73 X 18 X 30	260	19
10	"	Sports-center in Ansan	Hajung Co	87 X 40 X 10	440	20
1	2007	Ice-making liquid Tank In Incheon Intl Airport	Poonglim Co	40 X 27 X 6	135	18
2	"	2A-8 Ice-making liquid tank in Incheon Intl Airport	Kumho Co	27 X 15 X 5	55	11
3	"	Crematory in Goyang	POSCO Co	77 X 59 X 8	106	24
4	"	Korean electric power corporation Namsuwon Branch	Gumgwang Co	41 X 40 X 6	91	14
5	"	Distribution dev project in the southeast-Seoul	Kyeryong Co	48 X 9 X 10	261	26
6	"	Underground parking lot in Dangsang-Dong	Bohoon Co	61 X 40 X 10	518	21
7	"	Jookjun Brdg	Sambu Co	86 X 7 X 8	90	12
8	"	Chulsan Apt in Gwangmyeong	Kolon Co	14 X 27 X 10	110	20
9	"	Remodeling Pyungchang Apt	Lotte Co	46 X 21 X 14	260	18

Construction Records of IPS system

NO	Year	Construction Site	Construction	Size(m)	Material (ton)	Earth Pressure (t/m)
10	2007	Water works in Sungbook-Gu	Shinan Co	53 X 30 X 7	152	23
11	"	Reconstruction Apt in Guro-Onsoo	Hyundai Co	36 X 9 X 10	53	13
12	"	Business Bldg in Daechi-Dong	Yojin Co	32 X 27 X 16	231	16
13	"	Pump Facility in Hwajun Sec	Hyundai Co	46 X 29 X 11	322	31
14	"	Sec. 1 Facilities of Songdo	Korea Dev. Co	622 X 9 X 8	1541	15
15	"	Sec.1 Fishman compensation area facilities of Songdo	Korea Dev. Co	622 X 9 X 8	1541	15
16	"	Daeduck Business Hub Center	Public Procurement	67 X 56 X 19	496	16
17	"	Sec. 1-2 Facilities of Songdo	Halla Co	1572 X 9 X 10	2980	25
1	2008	Office Bldg of Fire power plant in Kunsan	Daelim Co	80 X 37 X 6	130	63
2	"	Sec.3-1 facilities of Songdo	Woosuk Co.	1250 X 9 X 9	2406	25
3	"	Complex Bldg in Joongnang-Gu	Dongyang Major	111 X 37 X 13	1020	22
4	"	Gasan disital empire Bldg in Seoul	Korea Dev. Co	74 X 80 X 17	1320	28
5	"	Jangchoong church of Presbyterian	Seohee Co	37 X 38 X 23	436	17
6	"	CWP Sec. of Fire power plant in Kunsan	Samsung C&T	52 X 33 X 14	739	62
7	"	SEAL Pit Sec. of Fire power plant in Kunsan	Samsung C&T	32 X 30 X 13	426	49
8	"	Intake Channel Sec. of Fire power plant in Kunsan	Samsung C&T	203 X 12 X 7	441	26
9	"	Drainpipe Sec. of Fire power plant in Kunsan	Samsung C&T	58 X 40 X 5	288	13
10	"	Sec.3-2, NSIC facilities of Songdo	Kyungnam	2267 X 8 X 9	4799	25
11	"	Sec. 2-2 Incheon Airport Railroad	Dongah Eng Co	18 X 23 X 21	30	32
12	"	Geoje Apt in Busan	Lotte Co	151 X 101 X 17	1545	17
13	"	North Incheon post office	Youseoung Co	73 X 26 X 17	420	20
1	2009	Pier of Kum-river 1st Brdg	SK Co	31 X 19 X 12	490	37
2	"	Complex Bldg. in Pankyo	Korea Dev. Co	48 X 27 X 10	210	13
3	"	Company Bldg. of Korea Technology Credit Guarantee	SSangyong Co	93 X 56 X 13	2099	30
4	"	IT Complex, Sangam	Daelim Co	79 X 70 X 28	674	26
5	"	Sewage Treatment Facilities SMD A1-PH3	Samsung Eng	22 X 23 X 11	76	27
6	"	Baekhyun-dong Community Center	Sepoong Co	39 X 41 X 5	73	6
7	"	#8 Ventilating Opening, Incheon airport rail road Sec.2-3A	Sambu Co(주)	37 X 23 X 11	223	12
8	"	Apartment of Kyodae, Seocho-gu	Daelim Co	200 X 11 X 13	427	19
9	"	Sookgok Underpass	Hyundai Co	328 X 22 X 10	1199	21
10	"	Gasan-dong Apt.-style Factory	Jinheung Co	100 X 37 X 17	942	28
1	2010	Yongjin Specialty Steel, Sihwa factory	Bomi Co	46 X 45 X 5	197	12
2	"	First church of christ in Ansan	Heung Hwa Co	102 X 43 X 19	1163	25
3	"	Pier in Gimpo Han-river road	Hyundai E&C	31 X 26 X 25	1199	89
4	"	Namseoul Church Day-care center	Hee Kyung E&C	33 X 31 X 11	191	10
5	"	Banpo4-dong public office	woosung Co	39 X 27 X 16	233	23
6	"	Dona-a Prime Valley	Dong-A E&C	74 X 43 X 19	1050	27
7	"	Isan Baekseok officetel	Jin Hung Co	78 X 60 X 19	2047	68
8	"	Samsung-dong villa	Dong Yang Major Co	35 X 37 X 14	250	25
9	"	Songdo 3 part dumping ground	Kumho E&C	30 X 20 X 11	197	19
10	"	Junghwa apartments	Dong Yang Major E&C	80 X 41 X 12	437	17
11	"	Honam high-speed railway roadbed 2-3	Hyun Dai E&C	21 X 21 X 12	695	20
12	"	Honam high-speed railway roadbed 2-4	Hyun Dai E&C	21 X 21 X 12	695	20
13	"	Shinlim-dong Gaya Withan	Yeo Kang C&C Co	83 X 43 X 17	1146	23
14	"	Construction of 1 Dream Tower	Free const E&C	28 X 36 X 13	188	12
15	"	RSM Gasan-apartment	Jin Hung Co	101 X 43 X 15	1205	34
16	"	Guro-Urban Residential buildings	Mun Young Co	62 X 22 X 12	483	29
17	"	Office block in Daelim-station	Dong Bu E&C	66 X 34 X 21	873	44
1	2011	Kyongin ara waterway in Gimpo Gochon	Poonglim Industry	16 X 21 X 11	118	43
2	"	Honam rapid transit railway 2-3 sec. bridge	Hyun Dai E&C	27 X 27 X 13	669	52
3	"	Honam rapid transit railway 2-4 sec. bridge	Hyun Dai E&C	27 X 27 X 13	669	52
4	"	Pyeongchon-dong public office	Cinema E&C	30 X 36 X 17	189	18
5	"	Dalseo-river sewage disposal plant	Tae Young E&C	78 X 62 X 11	1175	42
6	"	Seronam church, Dream center	Kyeryong E&C	50 X 41 X 12	370	13
7	"	Pump facility in Incheon complex 3 power plant	Kum Ho E&C	35 X 17 X 6	109	32
8	"	Pipeline facility expansion site in Songdo	Posco E&C	31 X 34 X 8	1908	25

Construction Records of IPS system

NO	Year	Construction Site	Construction	Size(m)	Material (ton)	Earth Pressure (t/m)
9	2011	Pariscroissant 4th factory	Hyun Dai Eng	130 X 45 X 21	1636	20
10	"	Complex Bldg. in Guro-dong	Mun Young Co	35 X 19 X 18	364	32
11	"	KCC Welltztower in Pangyo-station	KCC Co	79 X 36 X 21	682	15
12	"	Complex Bldg. in Guro-dong	Mun Young Co	22 X 26 X 18	261	32
13	"	Nokyang sec. Office block in Uijongbu	Dae A E&C	39 X 21 X 14	270	18
14	"	Mt.Nam The Rubens IPS construction	Jin Hung Co	150 X 100 X 18	1119	20
15	"	Mt.Nam The Rubens POST-PILE	Jin Hung Co	150 X 100 X 18	84	20
16	"	Bldg. in Daejeon Seogu Tanbang-dong	Kye Ryong E&C	57 X 59 X 18	1242	15
1	2012	CES(Community Energy System) Pump Building in Yangju	Hanjin Heavy I&C POSCO Co	83 X 43 X 9	87	13
2	"	CES Controll tower	Hanjin Heavy I&C POSCO Co	37 X 19 X 5	34	13
3	"	CES turbine tower	Hanjin Heavy I&C POSCO Co	55 X 30 X 11	202	13
4	"	CES waste water repository	Hanjin Heavy I&C POSCO Co	25 X 28 X 6	41	13
5	"	Urban living House Multiplex Building in Guro-dong	Mun Young Co	38 X 24 X 18	562	50
6	"	Community service center in Singal & Giheung health center	Yoo Ho D&C	85 X 60 X 11	483	8
7	"	Drainpipe Sec. Thermal Power Plant in Taeon	SK Co	650 X 18 X 10	3119	40
8	"	Gangnam Wise Place	Shinsegae Co	41 X 30 X 30	844	32
9	"	Yemizi APT in Pangyo	Kumsung Baekjoe Co	58 X 20 X 21	706	16
10	"	Gold Tower Construction	Kumsung Baekjoe Co	58 X 20 X 21	706	16
11	"	Urban living House in Sejong City C3-2B/L	Kyeryong Co	44 X 42 X 21	717	29
12	"	Government Complex Building in Hogye-dong	Hyolim Co	18 X 54 X 10	250	25
13	"	Drainpipe & Intake Channel Sec. of 3th Thermal Power Plant	Daelim Co	33 X 22 X 13	277	43
14	"	Drainpipe & Intake Channel Sec. of 4th Thermal Power Plant	Daelim Co	329 X 13 X 7	375	20
15	"	Hyundai Sun and Ville in guro-dong	Hyundai BS&C	46 X 28 X 12	229	17
16	"	Kyeryong Richeville APT In Yeongdeungpo	Kyeryong Co	142 X 75 X 10	1512	17
17	"	Office building in Sangil-dong earthwork	Hyosung Co	63 X 51 X 19	1082	34
18	"	Office building in Sangil-dong temporary facility	Hyosung Co	63 X 51 X 19	1082	34
19	"	HanShin Officetel in Sejong City	HanShin E&C	115 X 43 X 20	1937	25
1	2013	Drain & Intake Pipe Sec. of 1th Thermal Power Plant in Yeosu	POSCO Co	208 X 9 X 6	267	18
2	"	Korea Power Exchange Company Building	Kukje Co	32 X 26 X 12	205	15
3	"	LNG#5-7 Sea Water Discharge Box & Pond in Samcheok	Doosan Heavy I&C	43 X 34 X 13	562	45
4	"	Magok zone 1st, 2ed	Kumho Co	580 X 10 X 7	1266	23
5	"	Wastewater Treatment Facility in Seongmun industrial complex	SK Co	46 X 27 X 10	488	53
6	"	M Tower Convention Building	Duksung Co	67 X 40 X 12	523	29
7	"	Wastewater Treatment Facility in Taeon IGCC	Doosan Heavy I&C	59 X 51 X 9	954	33
8	"	Seongnam Sports Center	Dae-a E&C	134 X 102 X 21	409	27
9	"	Sejong University Building & Dormitory	Bomi Co	74 X 61 X 20	1957	59
10	"	Wastewater Treatment Facility in Cheonan	Samsung ENG	51 X 22 X 13	138	6
11	"	Malive in Sejong City	Taehan Co	83 X 52 X 25	2167	29
1	2014	Officetel in Daerim Station	POSCO Plantec	35 X 36 X 27	797	43
2	"	BRF-System in Sang-dong	Daeryook Co	61 X 46 X 8	578	27
3	"	Daegu Bank second head office	Hwasung Co	94 X 85 X 14	2166	19
4	"	Officetel in Sincheon-dong, Daegu	Shinsegae Co	75 X 30 X 25	1159	33
5	"	Neighborhood living Facilities in Simgokdong	A-tech Co	31 X 35 X 5	72	7
6	"	Officetel in Jungang-dong, Changwon	Joongang Co	81 X 33 X 18	678	27
7	"	Jinju Innovative City, Multiplex Building	Raon Co	42 X 36 X 23	580	31
8	"	Passenger Terminal, Gimhae International Airport	Hyundai dev Co	98 X 35 X 8	1192	20
9	"	Shinla STAY Hote in seongjeongdongl	Daebo Co	52 X 37 X 18	678	33
10	"	Sejong Media Plaza	Art Co	48 X 55 X 19	1192	27
11	"	Sejong bank building	Art Co	76 X 44 X 23	1132	35
12	"	Wastewater Repository, Taeon Power Plant	Young Shin Co	48 X 42 X 8	416	20
1	2015	Yulim Norway Forest residential Building in Daegu	Yulim E&C	135 X 36 X 12	622	14
2	"	Sejong Smart Hub 1,2	D&C Co	119 X 42 X 13	1151	35
3	"	Sejong Smart Hub 1,3	D&C Co	119 X 42 X 13	1151	35

Construction Records of IPS system

NO	Year	Construction Site	Construction	Size(m)	Material (ton)	Earth Pressure (t/m)
4	2015	Sejong Town 721 in Homaesil	Sejong E&C	62 X 33 X 20	833	41
5	"	Jeong-Gwan New Town Joeun Plus in Pusan	Heungwoo Co	86 X 46 X 21	1511	34
6	"	Value Hotel in Osong Biovalley	Shinhan Co	81 X 28 X 15	609	25
7	"	Trezen Wellga in GyeongBuk	HeungHan Co	29 X 35 X 23	83	28
8	"	Continuous Casting C#3 Scarfing in Dangjin	Hyundai ENG	47 X 25 X 10	333	35
9	"	Gimpo Subway Construction 5th	Hanwha E&C	25 X 20 X 19	340	40
10	"	Hyundai Sun and Vill in Cheonggye	Hyundai BS&c	40 X 35 X 21	731	42
11	"	International Apartment in DaechiDong	SK E&C	168 X 82 X 10	814	32
12	"	Benebiang	HeungHan Co	26 X 47 X 18	485	20
13	"	2nd Officetels in GyeongBuk-Do	eTEC E&C	64 X 34 X 14	487	18
14	"	Health center in Changwon	Aram Co	58 X 34 X 10	440	21
15	"	Hyundai Sun and Vill in Tehran	Hyundai BS&c	49 X 28 X 12	437	17
16	"	Gaun Town Officetel in Namyangju	KR Industry	52 X 36 X 15	535	20
17	"	Hotel in Changwon sangnamdong	Taeyoung E&C	83 X 35 X 12	566	20
18	"	IPARK-APT in Munjeong-dong	Hyundai Dev.	65 X 52 X 23	1697	38
19	"	#9-2 Officetel Near Gwangmyeong Station	Dae-a E&C	52 X 27 X 26	994	51
20	"	e-Space City-I	Eun-il Co.	63 X 33 X 14	482	18
21	"	Sejong Smart C2-2BL Hub 3	Taewon C&I	57 X 33 X 12	610	32
22	"	Sejong Smart C2-2BL Hub 4	Taewon C&I	40 X 30 X 14	519	41
1	2016	Haman Apartment & Stores	BHI	51 X 35 X 15	401	21
2	"	Icheon amiri officetel	KR Industry	76 X 34 X 22	739	29
3	"	Icheon thewelli officetel	Jeepyoung Co	41 X 26 X 16	619	31
4	"	Boram Building	KK Co	40 X 30 X 14	615	43
5	"	Pyeongchon Digital Empire	Korea Dev. Co	85 X 85 X 16	1873	30
6	"	KG company building in Seoul	KG Eng	43 X 34 X 18	497	24
7	"	Pangyo Hotel	Haeahn Architecture	35 X 37 X 35	600	20
8	"	Jeonju hyoja-dong 1540-1 Apartment & Stores	Jeongmin E&C	72 X 37 X 14	600	10
9	"	Kangnam Daechi-dong 00 Apartment & Stores	Korea Dev. Co	38 X 37 X 22	920	32
10	"	Ilsan Baekseok-dong Y-city Hotel	elmes korea	84 X 44 X 22	1749	42
11	"	Ansan Chamber of commerce and industry extension	Sungjee Co	36 X 48 X 12	500	26
12	"	Jeju-si Oedo 1- dong multi-unit dwelling Officetel	Doil Co	33 X 26 X 13	163	5
13	"	Yeongtong-gu hadong 985,985-1 business facility	Duksung Co	69 X 24 X 13	468	15
14	"	Hogye District Knowledge industry center	SK Co	135 X 59 X 19	1459	47
15	"	Sejong-si 2-4 lifezone urban atrium P2block	Kyeryong Co	100 X 78 X 13	1888	31
16	"	Mok 2-dong rental housing complex dev	CETS Eng	44 X 48 X 16	80	31
17	"	Incheon Bupyeong-dong officetel	Kyeryong Co	97 X 43 X 28	2281	41
18	"	Tokyo Electronkorea Icheon office	KR Industry	46 X 44 X 12	510	23
19	"	Chungju Dam Intake Pumping New construction	Korea Eng Consult Co	62 X 37 X 20	1400	35
20	"	Cheonan Tangeong Officetel	Kyeryong Co	60 X 52 X 20	1410	16
21	"	Osan-si won-dong Complex facility	Baytech Eng	82 X 72 X 21	850	31
22	"	Jinju-si Pyeonggeo-dong 00 Complex Building	Bujeon E&C	52 X 27 X 21	685	33
1	2017	Suwon-si Ingye-dong 1036-7 Officetel	KR Industry	68 X 20 X 22	690	30
2	"	Ulsan-si Nam-gu Sinjeong-dong 00 Officetel	Joongang Co	46 X 31 X 25	1333	35
3	"	ASM Dongtan Factory	Siwonenc	83 X 77 X 11	1287	30
4	"	Yangjaecheon road underground roadway	Isan	477 X 20 X 10	183	31
5	"	Magok District C6-2	Dain Dev. Co	44 X 45 X 23	750	42
6	"	Incheon Dohwa District distribution	KCC Co	130 X 74 X 13	1920	37
7	"	Kangnam District residential area 1-2 BL	BOM	50 X 33 X 13	376	33
8	"	Hanam MisaGangbyeon 8-1BL	Eun-il Co	54 X 29 X 17	1000	40
9	"	Okgil District Commerce 3-4 Commercial Facilities	Eun-il Co	28 X 31 X 16	190	26
10	"	Gangseo-gu Knowledge industry center	Daemyung	65 X 59 X 14	830	32
11	"	Bangi-dong 49-4 7 Commercial and Business Facilities	Aju Co	35 X 18 X 18	32	12

IPS

**INNOVATIVE
PRESTRESSED
SUPPORT SYSTEM**

Have you ever seen such wide and extensive excavation site?



IPS SUPPORTEC
Engineering & Construction

Tel. 82-2-3463-0797 Fax. 82-2-3463-0796 E-mail. supportec@supportec.co.kr
Home. www.supportec.co.kr Webhard. www.webhard.co.kr / ID. supportec / PW. 0000
Address. Supportec.Co.,Ltd. 3fl. Samho Bldg. 981-49 Bangbae-dong, Seocho-gu,
Seoul, 137-848 Republic of Korea