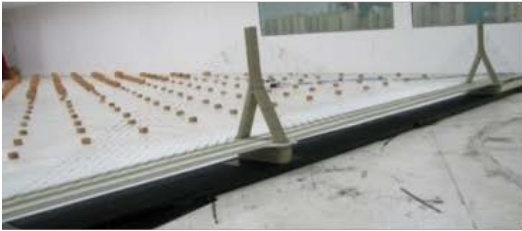

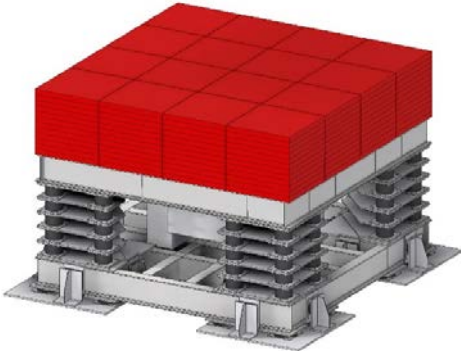

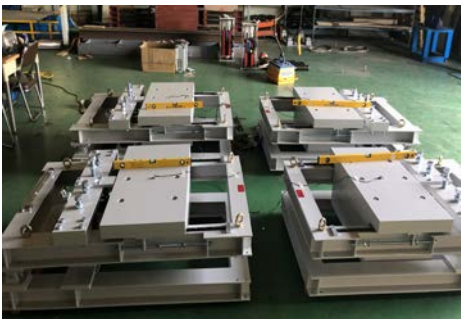
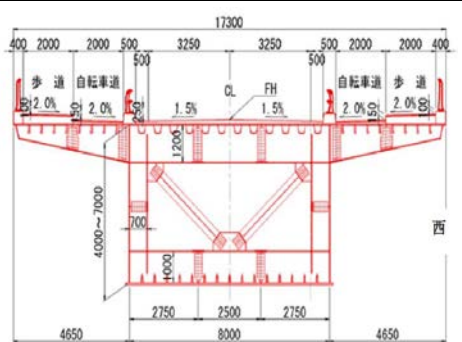





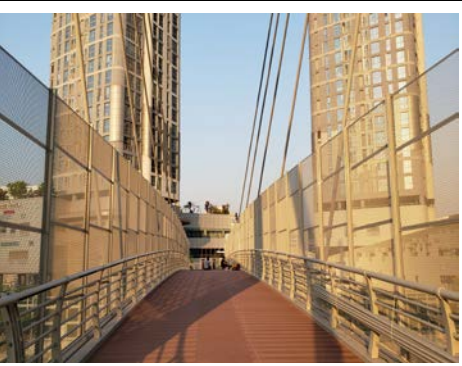









TRACK RECORD OF VIBRATION CONTROL DEVICE






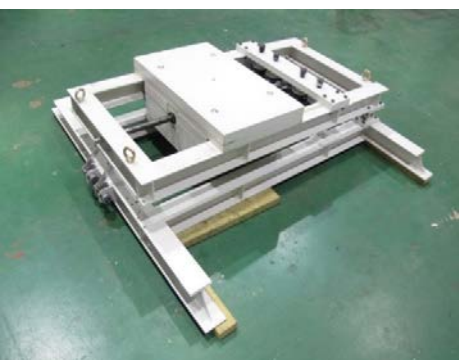








No.	Project	Vibration Control Device
45	 <p>Greenland Centre Sydney, Australia</p> <ul style="list-style-type: none"> Client: Probuild Construction Outline <ul style="list-style-type: none"> - Height: 235m - Frequency: 0.153Hz (x-dir) 0.170 (y-dir) Year: in progress 	 <ul style="list-style-type: none"> Type: TMD (1 set) Control direction: Horizontal bi-dir. Specification <ul style="list-style-type: none"> - Rubber Bearing + Coil-Spring type - Moving mass: 180tons - Stroke: $\pm 336\text{mm}$ Conceptual & Detailed Design / / Manufacture / Installation Supervision / Performance test /
44	 <p>Masan west harbor Bridge</p> <ul style="list-style-type: none"> Client: Suhyun Engineering Outline <ul style="list-style-type: none"> - Suspension bridge - Length: 130m - Frequency: 0.804Hz Year: in progress 	 <ul style="list-style-type: none"> Type: TMD (4sets) Control direction: Vertical Specification <ul style="list-style-type: none"> - Moving mass: 1.2ton (2 sets)+1.0ton (2 sets) - Stroke: 3cm(vert) Conceptual & Detailed Design / / Manufacture / Installation / Performance test /
43	 <p>Haneda Bridge, Japan</p> <ul style="list-style-type: none"> Client: Hitachi Zonsen Outline <ul style="list-style-type: none"> - Length: 594.7m (182+240+172.7) - Frequency: 0.563Hz(ver-dir) Year: in progress 	 <ul style="list-style-type: none"> Type: TMD (20 sets) Control direction: Vertical dir. Specification <ul style="list-style-type: none"> - Moving mass: 3.5ton (20 sets) - Installation location: Steel box girder Conceptual & Detailed Design / / Manufacture / Installation Supervision / Performance test /




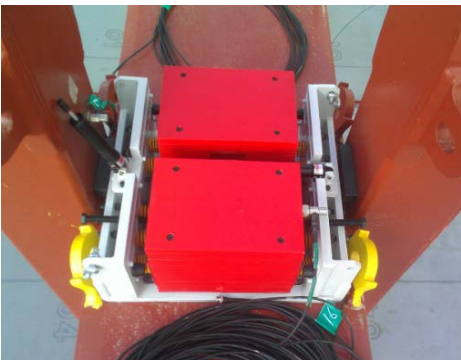

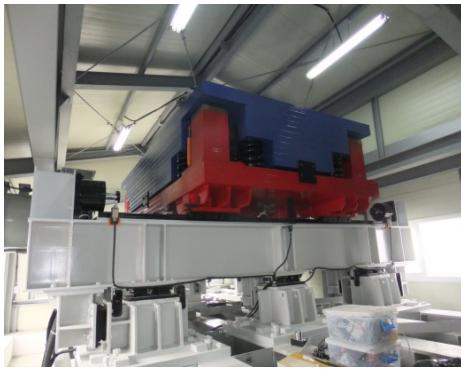
No.	Project	Vibration Control Device
42	 <p>2nd Namhae Bridge (Hanger Cable)</p> <ul style="list-style-type: none"> ▪ Client: GS E&C ▪ Outline <ul style="list-style-type: none"> - Suspension bridge - Length: 990m (50+890+50) - Cable Frequency: 1Hz ~ 40Hz - Damping ratio: 0.01%~0.03% ▪ Year: in progress 	 <ul style="list-style-type: none"> ▪ Type: Stockbridge Damper ▪ Control direction: horizontal dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 4.62kg +7.90 kg - Messenger Cable: Φ-16mm ▪ Achieve damping ratio : 0.687% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
41	 <p>Choansan Footbridge</p> <ul style="list-style-type: none"> ▪ Client: Hanyang Industry ▪ Outline <ul style="list-style-type: none"> - Arch Bridge - Length: 191m (45+80+40+30) - Frequency <ul style="list-style-type: none"> 1.594Hz(1st Ver-dir) 1.845Hz(2nd Ver-dir) - Damping ratio: 0.51% ▪ Year: in progress 	 <ul style="list-style-type: none"> ▪ Type: TMD (4sets) ▪ Control direction: Vertical ▪ Specification <ul style="list-style-type: none"> - Moving mass: <ul style="list-style-type: none"> 1.5ton (2 sets)+0.4ton (2 sets) - Stroke: 3cm(vert) ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
40	 <p>Wangsibri Haengdang Footbridge</p> <ul style="list-style-type: none"> ▪ Client: Samil E&C ▪ Outline <ul style="list-style-type: none"> - Cable Stayed Bridge - Length: 78m - Frequency <ul style="list-style-type: none"> 1.482Hz(Ver-dir) - Damping ratio: 0.346% ▪ Year: in progress 	 <ul style="list-style-type: none"> ▪ Type: TMD (2sets) ▪ Control direction: Vertical ▪ Specification <ul style="list-style-type: none"> - Moving mass: 0.7ton x2(vert) - Stroke: 5cm(vert) ▪ Achieve damping ratio : 5.134% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /







No.	Project	Vibration Control Device
39	 <p>Incheon International Airport Main Tower</p> <ul style="list-style-type: none"> ▪ Client: Sungji E&C ▪ Outline <ul style="list-style-type: none"> - Airtraffic control tower - Height: 100.4m - Frequency: 0.71Hz(X), 0.74Hz(Y) - Damping ratio: 0.6% ▪ Year: 2017 	 <ul style="list-style-type: none"> ▪ Type: AMD (2 sets) ▪ Control direction: Horizontal bi-dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 6.78ton(X), 9.23ton(Y) - Stroke: ± 350mm - Optimal damping ratio: 15.0% ▪ Achieve damping ratio : 13.24%(X), 13.65%(Y) ▪ Replacement of Control unit / / Performance test /
38	 <p>Pyeongtaek Bridge (Stay Cable)</p> <ul style="list-style-type: none"> ▪ Client: SK E&C ▪ Outline <ul style="list-style-type: none"> - Extradosed bridge - Length: 1210m (7 Pylons) - Cable Frequency: 2Hz ~ 10Hz - Damping ratio: 0.04%~0.06% ▪ Year: 2017 	 <ul style="list-style-type: none"> ▪ Type: Stockbridge Damper ▪ Control direction: Vertical dir. ▪ Specification <ul style="list-style-type: none"> - High-frequency & Low-frequency Combined Type - Messenger Cable: Φ-19mm ▪ Achieve damping ratio : 0.316% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
37	 <p>Gonjiam Hwadam Forest Footbridge</p> <ul style="list-style-type: none"> ▪ Client: Serve One ▪ Outline <ul style="list-style-type: none"> - Arch Bridge - Length: 59m - Frequency <ul style="list-style-type: none"> 2.28Hz(Hor-dir) 8.20Hz(Ver-dir) ▪ Year: 2017 	 <ul style="list-style-type: none"> ▪ Type: TMD (3sets) ▪ Control direction: Vertical, Horizontal ▪ Specification <ul style="list-style-type: none"> - Moving mass: 0.4ton x2(hor), 0.3t(ver) - Stroke: 0.587cm/0.779cm(hor), 0.1m(ver) ▪ Achieve damping ratio: <ul style="list-style-type: none"> 8.176%(Hor.), 5.84%(ver.) ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /




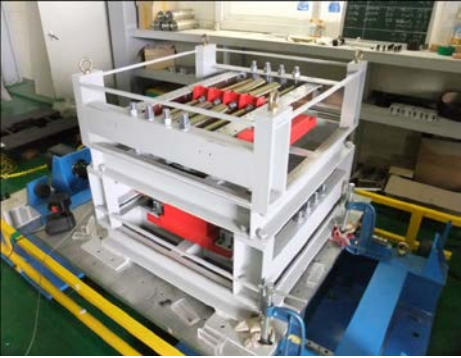


No.	Project	Vibration Control Device
36	 <p>New York Wheel, USA</p> <ul style="list-style-type: none"> ▪ Client: Mammoet-Starneth ▪ Outline <ul style="list-style-type: none"> - Height: 192m - Frequency 0.737Hz(x-dir) 0.278Hz(y-dir) ▪ Year: In progress 	 <ul style="list-style-type: none"> ▪ Type: Brace TMD(2ea) ▪ Control direction: horizontal bi-dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 32ton & 28ton - Stroke: 50mm(xdir) 270mm(y-dir) - Optimal damping ratio : 6% ▪ Conceptual & Detailed Design / / Manufacture / Installation supervision / / Performance test /
35	 <p>Taichung Bauger Building, Taiwan</p> <ul style="list-style-type: none"> ▪ Client: CEC (Continental Engineering Orporation) ▪ Outline <ul style="list-style-type: none"> - Height: 158.4m - Frequency 0.237Hz(x-dir) 0.230Hz(y-dir) ▪ Year: In progress 	 <ul style="list-style-type: none"> ▪ Type: Pendulum type ▪ Control direction: horizontal dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 150ton - Stroke: 0.6m(xdir) 1.35m(y-dir) - Optimal damping ratio : 12.3% ▪ Conceptual & Detailed Design / / Manufacture / Installation Supervision / / Performance test /
34	 <p>Incheon International Airport 2nd Tower</p> <ul style="list-style-type: none"> ▪ Client : Dongyang E&C ▪ Outline <ul style="list-style-type: none"> - Steel & concrete - Height : 93.90m - Frequency : 0.9560Hz (y-dir) 1.0231Hz (x-dir) - Damping ratio : 0.6% ▪ Year: 2017 	 <ul style="list-style-type: none"> ▪ Type : AMD (2 set) ▪ Control direction : Horizontal bi-dir. ▪ Specification <ul style="list-style-type: none"> - Moving Mass : 10.4ton(x), 9.2ton(y) (2sets) - Stroke: ±70mm - Optimal damping ratio: 8.39%(x), 9.89%(y) ▪ Achieve damping ratio: 8.19%(x), 6.66%(y) ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /







No.	Project	Vibration Control Device
33	 <p>DUBAI I Ferris Wheel, UAE</p> <ul style="list-style-type: none"> ▪ Client : Hyundai E&C ▪ Outline <ul style="list-style-type: none"> - 4 leg column+Wheel - Height: 258m - Diameter of wheel: 250m - World's Highest Ferris Wheel ▪ Year: In progress 	 <ul style="list-style-type: none"> ▪ Type : LEG TMD (4ea), Brace TMD(2ea) ▪ Control direction : horizontal dir.(X&Y) ▪ Specification <ul style="list-style-type: none"> - Moving mass: 4ton(4ea) & 45ton(2ea) - Installation location: Leg - Optimal damping ratio: 10% - Stroke: 250mm (45ton) / 300mm(4ton) ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
32	 <p>Palyung Bridge (Hanger Cable)</p> <ul style="list-style-type: none"> ▪ Client: Daelim Industries ▪ Outline <ul style="list-style-type: none"> - Suspension bridge - Length: 1340m (310+850+180) - Cable Frequency: 1Hz ~ 40Hz - Damping ratio: 0.01%~0.03% ▪ Year: 2016 	 <ul style="list-style-type: none"> ▪ Type: Stockbridge Damper ▪ Control direction: horizontal dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 4.62kg +7.90 kg - Messenger Cable: Φ-16mm ▪ Achieve damping ratio : 0.695% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
31	 <p>Cheonan Cheongsoo Footbridge</p> <ul style="list-style-type: none"> ▪ Client: Heunglim construction ▪ Outline <ul style="list-style-type: none"> - Cable Stayed bridge - Length: 38.15m - Frequency: 1.9296Hz (V) - Damping ratio: 0.44% ▪ Year: 2015 	 <ul style="list-style-type: none"> ▪ Type: TMD (1 set) ▪ Control direction: Vertical dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 0.75ton(1 set) - Stroke : ±13mm - Optimal damping ratio: 6.7% ▪ Achieve damping ratio : 6.403% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /







No.	Project	Vibration Control Device
30	 <p>Ulsan Bridge (Hanger Cable)</p> <ul style="list-style-type: none"> ▪ Client: Hyundai E&C ▪ Outline <ul style="list-style-type: none"> - Suspension Bridge - Length : 1,800m - Cable Frequency: 1Hz ~ 40Hz - Damping ratio: 0.016%~0.04% ▪ Year: 2015 	 <ul style="list-style-type: none"> ▪ Type: Stockbridge damper (120 sets) ▪ Control direction: horizontal dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 4.62kg +7.90 kg - Messenger Cable: Φ-16mm ▪ Achieve damping ratio : 0.35% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
29	 <p>Sejong Government Office Footbridge</p> <ul style="list-style-type: none"> ▪ Client: OK Consultant ▪ Outline <ul style="list-style-type: none"> - Single span+2span bridge - Length : 163m - Frequency : 2.07Hz - Damping ratio : 0.92% ▪ Year: 2014 	 <ul style="list-style-type: none"> ▪ Type: TMD (3 sets) ▪ Control direction: Vertical dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 1.0ton (3 sets) - Installation location: Under the deck ▪ Achieve damping ratio : 2.12% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
28	 <p>Daehalang Kkochgelang Footbridge</p> <ul style="list-style-type: none"> ▪ Client : Hyundai Steel ▪ Outline <ul style="list-style-type: none"> - Cable Stayed bridge - Length : 260m - Frequency : 1.9296Hz (V) - Damping ratio : 0.28% ▪ Year : 2013 	 <ul style="list-style-type: none"> ▪ Type : TMD (4 sets) ▪ Control direction : Vertical dir. ▪ Specification <ul style="list-style-type: none"> - moving mass : 1.5ton(2ea), 0.6ton(2ea) - stroke : ±28mm - optimal damping ratio : 6.8% ▪ Achieve damping ratio : 5.4% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /


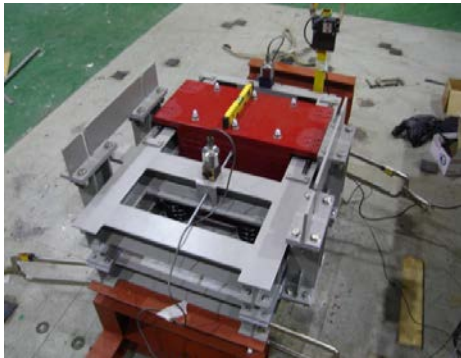




No.	Project	Vibration Control Device
27	 <p>Gangneung Dano Footbridge</p> <ul style="list-style-type: none"> ▪ Client: Gangneung City Hall ▪ Outline <ul style="list-style-type: none"> - 3-span steel Bridge - Length: 108m - Frequency: 2.01Hz (1st V), 3.07Hz (2nd V) - Damping ratio: 0.47%(1st), 0.77%(2nd) ▪ Year: 2013 	 <ul style="list-style-type: none"> ▪ Type : TMD (3 sets) ▪ Control direction : Vertical dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 1.6ton (1ea), 0.3ton (2ea) - Stroke : $\pm 30\text{mm}$ ▪ Achieve damping ratio 9.7%(1st V), 9.3%(2nd V) ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
26	 <p>Lashing Bridge on Maersk Ship</p> <ul style="list-style-type: none"> ▪ Client : DSME ▪ Outline <ul style="list-style-type: none"> - Lashing Bridge - Hight: 8.5m - Frequency: 6.0~8.0Hz - Damping ratio: 0.2% ▪ Year: 2013 	 <ul style="list-style-type: none"> ▪ Type : TMD (2 sets) ▪ Control direction : Horizontal dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass : 0.2ton (2 sets) - Stroke : $\pm 15\text{mm}$ - Optimal damping ratio : 8.96% ▪ Achieve damping ratio: 6.81% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
25	 <p>Gang-byun Techno Mart</p> <ul style="list-style-type: none"> ▪ Client: Prime Development Co., Ltd ▪ Outline <ul style="list-style-type: none"> - Shopping Mall & Office - Height: 187m(39-stories) - Frequency: 0.19Hz(Y-Dir.), 2.7Hz(Z-Dir.) - Damping ratio: 1.0% (Y-dir.), 0.3% (Z-dir.) ▪ Year : 2013 	 <ul style="list-style-type: none"> ▪ Type: HMD (AMD+TMD, 1 sets) ▪ Control direction: Ver. & Hor. dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: V.40t(TMD), H.50t(AMD) - Stroke: $\pm 10\text{mm}$(TMD), $\pm 600\text{mm}$(AMD) - Optimal damping ratio: 4.63%(TMD) ▪ Achieve damping ratio: 6.7%(x), 6.7%(z) ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /


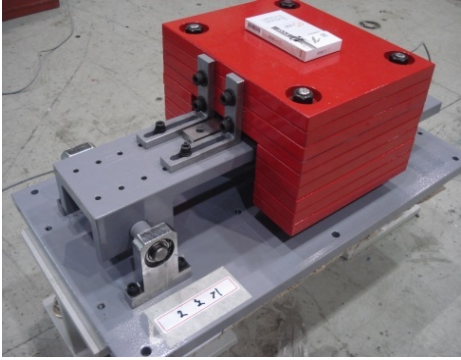



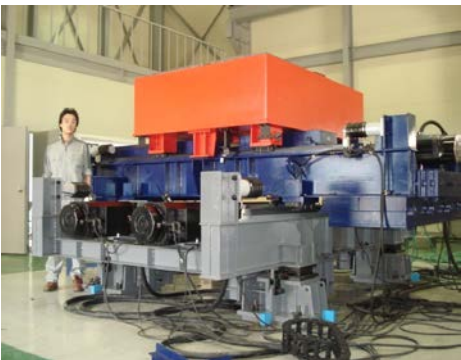
No.	Project	Vibration Control Device
24	 <p>Songdo 4th Bridge, Tower during Construction & In-service</p> <ul style="list-style-type: none"> ▪ Client : GS E&C ▪ Outline <ul style="list-style-type: none"> - Cable stayed bridge - Height: 105.2m - Frequency: 0.351Hz~0.645Hz (During Construction) - Damping ratio: 0.4% ▪ Year: 2013 	 <ul style="list-style-type: none"> ▪ Type: TMD (2 sets) ▪ Control direction : Horizontal dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass : 6.0 ton (2 sets) - Stroke : ± 460mm - Optimal damping ratio : 7.3% ~ 8.3% ▪ Achieve damping ratio: 5.76% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
23	 <p>2nd Jindo Bridge (In-Service Stage)</p> <ul style="list-style-type: none"> ▪ Client: Hyundai E&C ▪ Outline <ul style="list-style-type: none"> - Cable stayed bridge - Length: 484m - Frequency: 0.438Hz ▪ Year: 2012 	 <ul style="list-style-type: none"> ▪ Type: TMD (4 sets) ▪ Control direction: Vertical dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 3.25ton (4 sets) - Installation location: Steel box girder ▪ Achieve damping ratio: 5.75% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
22	 <p>Paju Lotte Premium Outlets Footbridge</p> <ul style="list-style-type: none"> ▪ Client: Lotte Shopping ▪ Outline <ul style="list-style-type: none"> - 2-span steel bridge - Length: 93m - Frequency: 1.78Hz (V) - Damping ratio: 0.76% ▪ Year: 2012 	 <ul style="list-style-type: none"> ▪ Type: TMD (4 sets) ▪ Control direction: Vertical dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 0.75ton (4 sets) - Stroke: ± 30mm - Optimal damping ratio: 6.0% ▪ Achieve damping ratio: 8.6% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /

No.	Project	Vibration Control Device
21	 <p>BEXCO Footbridge</p> <ul style="list-style-type: none"> ▪ Client: Seung Hwa Plant ▪ Outline <ul style="list-style-type: none"> - Cable stayed bridge - Length: 82m - Frequency: 1.60Hz (V) - Damping ratio: 0.7% ▪ Year: 2012 	 <ul style="list-style-type: none"> ▪ Type : TMD (2 sets) ▪ Control direction : Vertical dir. ▪ Specification <ul style="list-style-type: none"> - moving mass : 1.3ton (2 sets) - stroke : $\pm 100\text{mm}$ - optimal damping ratio : 3.6% ▪ Achieve damping ratio: 3.05% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
20	 <p>Ube Steel Stack, Japan</p> <ul style="list-style-type: none"> ▪ Client: Hitachi Zosen (JAPAN) ▪ Outline <ul style="list-style-type: none"> - Steel chimney - Height: 50m - Frequency: 1.567Hz(X,Y) - Damping ratio: 1.27%(X), 1.02%(Y) ▪ Year: 2011 	 <ul style="list-style-type: none"> ▪ Type: TMD (2 sets) ▪ Control direction: Horizontal bi-dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 0.24ton (2 sets) - Stroke: $\pm 95\text{mm}$ - Optimal damping ratio: 10.8% ▪ Achieve damping ratio: 3.799%(X), 3.336%(Y) ▪ Conceptual & Detailed Design / / Manufacture / Installation Supervision / / Performance test /
19	 <p>Ulleungdo Footbridge</p> <ul style="list-style-type: none"> ▪ Client: New-millennium E&C ▪ Outline <ul style="list-style-type: none"> - Suspension bridge - Length: 140m - Frequency: 1.80Hz(V) - Damping ratio: 0.4% ▪ Year: 2011 	 <ul style="list-style-type: none"> ▪ Type: TMD (2 sets) ▪ Control direction: Vertical dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 1.2ton (2 sets) - Stroke: $\pm 30\text{mm}$ - Optimal damping ratio: 14.2% ▪ Achieve damping ratio: 8.69% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /







No.	Project	Vibration Control Device
18	 <p>Dongchon Footbridge</p> <ul style="list-style-type: none"> ▪ Client: Cheonggu E&C. ▪ Outline <ul style="list-style-type: none"> - Cable stayed bridge - Length: 222m - Frequency: 1.63Hz (V) - Damping ratio: 0.4% ▪ Year: 2011 	 <ul style="list-style-type: none"> ▪ Type: TMD (6 sets) ▪ Control direction: Vertical dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 1.4ton(2ea), 0.4ton(4ea) - Stroke: $\pm 30\text{mm}$ - Optimal damping ratio: 10.0% ▪ Achieve damping ratio: 5.91% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
17	 <p>Hyundai-steel Stock House</p> <ul style="list-style-type: none"> ▪ Client: Hyundai-steel ▪ Outline <ul style="list-style-type: none"> - Long span slab - Frequency: 13.6~15.7Hz - Damping ratio: 0.3% ▪ Year: 2011 	 <ul style="list-style-type: none"> ▪ Type: TMD (38 sets) ▪ Control direction: Vertical dir. ▪ Specification <ul style="list-style-type: none"> - Leaf spring & silicone damper - Moving mass: 0.06ton (38 sets) - Stroke: $\pm 25\text{mm}$ - Optimal damping ratio: 4.0~6.0% ▪ Achieve damping ratio: 2.51% ▪ Conceptual & Detailed Design / Manufacture / Installation / Performance test
16	 <p>Yeoido Setgang Footbridge</p> <ul style="list-style-type: none"> ▪ Client: Ilkyung E&C. ▪ Outline <ul style="list-style-type: none"> - Cable stayed bridge - Length: 220m - Frequency: 0.94Hz(V), 1.11Hz(H) - Damping ratio: 0.6% ▪ Year: 2011 	 <ul style="list-style-type: none"> ▪ Type: TMD (4 sets) ▪ Control direction: Ver. & Horizontal ▪ Specification <ul style="list-style-type: none"> - Moving mass: V.1.2ton(2ea), H.1.2ton(2ea) - Stroke: V : $\pm 70\text{mm}$, H : 110mm - Optimal damping ratio: 2.0% ▪ Achieve damping ratio: 4.41%(V), 2.55%(H) ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /

No.	Project	Vibration Control Device
15	 <p>Pylon of Geoga Bridge</p> <ul style="list-style-type: none"> ▪ Client: Deawoo E&C ▪ Outline <ul style="list-style-type: none"> - 3-pylon cable stayed bridge (Construction stage) - Height : 101.9m - Frequency : 0.22~0.28Hz - Damping ratio : 0.5% ▪ Year: 2010 	 <ul style="list-style-type: none"> ▪ Type: TMD (3 sets) ▪ Control direction: Longitudinal dir. ▪ Specification <ul style="list-style-type: none"> - Pendulum type - Moving mass: 24.0ton (3 sets) - Stroke: $\pm 3000\text{mm}$ - Optimal damping ratio: 2.23% ▪ Achieve damping ratio: 5.38% ▪ Conceptual & Detailed Design / Manufacture / Installation / Performance test
14	 <p>POSCO E&C Head Office (A)</p> <ul style="list-style-type: none"> ▪ Client: POSCO E&C ▪ Outline <ul style="list-style-type: none"> - Height: 185m(39-stories) - Frequency: 0.26Hz(X), 0.24Hz(Y) - Damping ratio: 1.0% ▪ Year: 2010 	 <ul style="list-style-type: none"> ▪ Type: TMD (1 set) ▪ Control direction: Horizontal bi-dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass : 80.0ton - Stroke : $\pm 300\text{mm}$ - Optimal damping ratio: 4.5%(X), 4.7%(Y) ▪ Achieve damping ratio: 4.58%(X), 8.49%(Y) ▪ Conceptual & Detailed Design / Manufacture / Installation / Performance test /
13	 <p>POSCO E&C Head Office (B)</p> <ul style="list-style-type: none"> ▪ Client : POSCO E&C ▪ Outline <ul style="list-style-type: none"> - Height: 185m(39-stories) - Frequency: 0.25Hz(X), 0.24Hz(Y) - Damping ratio: 1.0% ▪ Year: 2010 	 <ul style="list-style-type: none"> ▪ Type: TMD (1 set) ▪ Control direction: Horizontal bi-dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass : 160.0ton - Stroke : $\pm 250\text{mm}$ - Optimal damping ratio : 6.1%(X), 6.6%(Y) ▪ Achieve damping ratio: 3.60%(X), 4.94%(Y) ▪ Conceptual & Detailed Design / Manufacture / Installation / Performance test /

No.	Project	Vibration Control Device
12	 <p>Naksaeng Footbridge</p> <ul style="list-style-type: none"> ▪ Client: Lotte E&C ▪ Outline <ul style="list-style-type: none"> - Cable stayed bridge - Length: 54m - Frequency: 1.52Hz(V) - Damping ratio: 0.6% ▪ Year: 2009 	 <ul style="list-style-type: none"> ▪ Type: TMD (2 sets) ▪ Control direction: Vertical dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 0.8ton (2 sets) - Stroke: $\pm 40\text{mm}$ - Optimal damping ratio: 4.7% ▪ Achieve damping ratio: 5.4% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
11	 <p>Alpensia Ski Jump Tower</p> <ul style="list-style-type: none"> ▪ Client : Taeyoung E&C ▪ Outline <ul style="list-style-type: none"> - Height : 115m - Frequency : 0.49Hz(X), 0.39Hz(Y) - Damping ratio : 2.0% ▪ Year : 2009 	 <ul style="list-style-type: none"> ▪ Type : TMD (1set) ▪ Control direction : Horizontal bi-dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass : 25.0ton(X), 23.0ton(Y) - Stroke : $\pm 250\text{mm}$ - Optimal damping ratio : 5.6%(X), 5.4%(Y) ▪ Achieve damping ratio: 3.43%(X), 3.43%(Y) ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
10	 <p>Namsan Cable Car</p> <ul style="list-style-type: none"> ▪ Client: Namsan Cable Car Way ▪ Outline <ul style="list-style-type: none"> - Cable Car - Weight: 5,600kg - Total length: 605m - Frequency: 0.16~0.27Hz - Damping ratio: 1.0% ▪ Year: 2009 	 <ul style="list-style-type: none"> ▪ Type: TMD (2sets) ▪ Control direction: Transverse ▪ Specification (Pendulum Type) <ul style="list-style-type: none"> - Moving mass : 170kg (2 sets) - Stroke : 700mm - Magnetic Damper - Optimal damping ratio : 7.0% ▪ Achieve damping ratio: 6.564% ▪ Conceptual & Detailed Design / Manufacture / Installation / Performance test

No.	Project	Vibration Control Device
9	 <p>Light Rail Transit, LRT</p> <ul style="list-style-type: none"> ▪ Client: IHI corporation, Japan ▪ Outline <ul style="list-style-type: none"> - Light Rail Transit - Frequency: 8.0~10.0Hz - Damping ratio: 1.0%(approx.) ▪ Year: 2009 	 <ul style="list-style-type: none"> ▪ Type: TMD (2 sets) ▪ Control direction: Vertical dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 40kg (2 sets) - Stroke: $\pm 5.0\text{mm}$ - Optimal damping ratio: 7.0% ▪ Achieve damping ratio: 2.1% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
8	 <p>Cheonan Footbridge</p> <ul style="list-style-type: none"> ▪ Client: Human bridge ▪ Outline <ul style="list-style-type: none"> - Suspension bridge - Length: 63m - Frequency: 2.8Hz(V) - Damping ratio: 0.5% ▪ Year: 2008 	 <ul style="list-style-type: none"> ▪ Type: TMD (2 sets) ▪ Control direction: Vertical dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass : 0.6ton (2 sets) - Stroke : $\pm 50\text{mm}$ - Optimal damping ratio : 5.0% ▪ Achieve damping ratio: 6.985% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
7	 <p>Ulsan Lotte Hotel</p> <ul style="list-style-type: none"> ▪ Client: IHI corporation, Japan ▪ Outline <ul style="list-style-type: none"> - Hotel - Height: 110m (24-stories) - Frequency: 0.42Hz(X), 0.36Hz(Y) - Damping ratio: 1.0% ▪ Year: 2007 	 <ul style="list-style-type: none"> ▪ Type : AMD (2 sets) ▪ Control direction : Horizontal bi-dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass : 20.0ton(X), 10.0ton(Y) - Stroke : $\pm 600\text{mm}$ - Optimal damping ratio : 20.6%(X), 13.9%(Y) ▪ Achieve damping ratio: 12.8%(X), 7.5%(Y) ▪ Conceptual & Detailed Design / Manufacture / Installation / Performance test

No.	Project	Vibration Control Device
6	 <p>Whaseong Dongtan Footbridge</p> <ul style="list-style-type: none"> ▪ Client: KR ▪ Outline <ul style="list-style-type: none"> - Nielsen arch bridge - Length: 87m - Frequency: 2.50Hz(V), 1.57Hz(H) - Damping ratio: 0.5% ▪ Year: 2006 	 <ul style="list-style-type: none"> ▪ Type: TMD (6 sets) ▪ Control direction: Vertical & Horizontal ▪ Specification <ul style="list-style-type: none"> - Moving mass: 0.6ton (Ver., 4 sets) 0.6ton (Hor., 2 sets) - Stroke: $\pm 50\text{mm}$ - Optimal damping ratio: 5.0% ▪ Achieve damping ratio: 4.31%(V), 2.50%(H) ▪ Conceptual & Detailed Design / Manufacture / Installation / Performance test
5	 <p>Eunpa Footbridge</p> <ul style="list-style-type: none"> ▪ Client: Human bridge ▪ Outline <ul style="list-style-type: none"> - Suspension bridge - Length: 110m - Frequency: 1.77Hz - Damping ratio: 0.5% ▪ Year: 2006 	 <ul style="list-style-type: none"> ▪ Type: TMD (2 sets) ▪ Control direction: Vertical dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 0.65ton (2 sets) - Stroke: $\pm 40\text{mm}$ - Optimal damping ratio: 5.0% ▪ Achieve damping ratio: 2.8% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /
4	 <p>Busan Centumcity</p> <ul style="list-style-type: none"> ▪ Client: POSCO E&C ▪ Outline <ul style="list-style-type: none"> - Residence building - Weight: 33950ton - Height: 121.7m - Frequency: 0.52Hz(X), 0.47Hz(Y) - Damping ratio: 1.0% ▪ Year: 2004 	 <ul style="list-style-type: none"> ▪ Type: TMD (3 sets) ▪ Control dir : Horizontal dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass: 100ton - Stroke: $\pm 300\text{mm}$ ▪ Optimal damping ratio: 6.0% ▪ Achieve damping ratio: 4.15%(X), 3.90%(Y) ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /

No.	Project	Vibration Control Device
3	 <p>2nd Jindo Bridge, Tower during Construction</p> <ul style="list-style-type: none"> ▪ Client: Hyundai E&C ▪ Outline <ul style="list-style-type: none"> - Construction stage - Cable stayed bridge - Height: 88.9m - Frequency: 0.576Hz - Damping ratio: 0.2% ▪ Year: 2003 	 <ul style="list-style-type: none"> ▪ Type: Sliding Block (2 sets) ▪ Control direction: Horizontal dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass : 4.5ton (2 sets) - Stroke : $\pm 385\text{mm}$ - Friction Coefficient : 0.3 ▪ Achieve damping ratio: 3.6% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test
2	 <p>2nd Jindo Bridge, Deck during Construction</p> <ul style="list-style-type: none"> ▪ Client: Hyundai E&C ▪ Outline <ul style="list-style-type: none"> - Construction stage - Cable stayed bridge - Length: 484m - Frequency: 0.19~1.0Hz - Damping ratio: 0.4% ▪ Year: 2003 	 <ul style="list-style-type: none"> ▪ Type: TMD (2 sets) ▪ Control direction: Horizontal dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass : 12.0ton (2 sets) - Stroke : $\pm 1000\text{mm}$ - Optimal damping ratio : 6.0% ▪ Achieve damping ratio: 5.55% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test
1	 <p>Rima Building</p> <ul style="list-style-type: none"> ▪ Client: Rima ▪ Outline <ul style="list-style-type: none"> - Slab vibration due to traffic load - Frequency: 10.5Hz(Z) - Damping ratio: 2.0% ▪ Year: 2001 	 <ul style="list-style-type: none"> ▪ Type: TMD (1 set) ▪ Control direction: Vertical dir. ▪ Specification <ul style="list-style-type: none"> - Moving mass : 200kg - Stroke : $\pm 50\text{mm}$ - Optimal damping ratio : 4.0% ▪ Achieve damping ratio: 3.2% ▪ Conceptual & Detailed Design / / Manufacture / Installation / / Performance test /