Proceedings

of

The 30th Symposium on Development in Prestressed Concrete

Contents

Invited Lecture				
I	Concrete Structures and Historical Background in Hakodate	SAWAMURA Shuji	(1)	
Gene	ral Paper			
(1)	Construction of PC Upper Part of General National Highway No. 474 San-Ennanshin No. 1 Bridge	NAGAYA Kazumasa MATSUI Yukinari KUNIEDA Kuniyoshi	1	
(2)	Construction of Kinugawa LRT Bridge by Cantilever Method	YAMAZAKI Kazuhiro YUASA Takuo	5	
(3)	Construction of Yunosawagawa Bridge	IWASAWA Miwa TANADA Naohiro SAITO Tsuyoki KUDO Yoji	9	
(4)	Design and Construction of Hokuriku Shinkansen Okurayoza Bridge	TOMONAGA Hikaru KASHIWAGI Ryo IKEHATA Bunya ISHIDA Takeshi	13	
(5)	Construction of Yunosawa River Bridge (Wide Bridge) Using a Widening Correspondence Type Movement Maintenance Vehicle	TERAKADO Naoyuki SATO Masatoshi KAKIZAKI Takashi TAKIYA Akihito	17	
(6)	Design and Construction of IZU Longitudinal Expressway KAWAZU SIMODA A Ramp Bridge	HIRASAWA Kosuke ITO Takuya	21	
(7)	Design and Construction of Corrugated Steel Plate Web Box Girder Bridge Constructing near the Existing Bridge	SHINJO Kohei TAKESHITA Toshiki SASAKI Katsushi YAMAGUCHI Takashi	25	
(8)	Erection of SAINAIGAWA BRIDGE of JR TAZAWAKO-LINE	FUJINOKI Tsutomu URABE Keisuke KIMURA Masaki SAKAMOTO Ryou	29	
(9)	Efforts to Solve the Problem of Corrugated Steel-Web Prestressed Concrete Box Girder Bridge of YANAGISHIMA Viaduct of Shin-Tomei Expressway	ONOZATO Isao KAWASHIRI Katsutoshi KATO Shigeki	33	

(10)	Construction of a Curtain Wall in a Tsunami Protection Measures for Sluice Gate	ITOU Shun SHIBATA Makoto OGATA Toru SAEKI Hidetaka	37
(11)	Efforts to Shorten the Process at Kamimiyajigawabashi on the Okayama Expressway	NAKASHIMA Hiroki SAKURA Kenji YOKOYAMA Kenta SONOKI Tetuo	41
(12)	Jack Down Method for the PC Hollow Slab Bridge with Skew Angle - Construction Work of HACHIMANGAWA BRIDGE -	INUGAI Tsuyoshi KATOU Hiroshi YOKOTA Minoru	45
(13)	Construction of the Fording Department Land Bridge in the Flood Time	IMAZATO Hajime KOUDA Takeshi NAKAGAWA Toshihiko SUDOU Osamu	49
(14)	Construction of SINITINOWATARI BRIDGE	SATOU Takanori WADA Kouiti HARAKO Kazuo	53
(15)	Design and Construction of MAIZURU-WAKASA EXPRESSWAY TACHI BRIDGE	NAKA Takashi TAKESHITA Toshiki SASAKI Katsushi YAMAGUCHI Takashi	57
(16)	Construction Report of Kyusyu Chuou Expressway Johira Overpass	NAKAHARA Ichiro KOKUSYOU Jo HATA Hiroaki	61
(17)	Measures on Stationary False Work Construction Adjacent to Service Road	MIYAZAKI Reiji ASAGAKI Wataru TAMURA Yoshiaki	65
(18)	Various Erection Methods in Narrow Places in Elevated Railways	OOTA Masamichi MATUFUJI Syouji TOYOSHIMA Shingo	69
(19)	Structural Plan and Trial Analysis Results of Railway Viaducts with Road Height Restrictions	MITSUKE Yuki KUTOMI Osamu SHINODA Kenji	73
(20)	Replacement of Concrete Slab of Chugoku Expressway HokubouIC - OsaSIC Section (Up Line)	AMAGO Daisuke KOGA Yoshiki HAYASHI Masanao HISANO Shingo	77
(21)	Construction of Floor Slab Replacement Work at HOKURIKU EXPRESSWAY KUZURYUGAWA BRIDGE	FURUKAWA Seiichiro HORITA Junzo IWABUCHI Masakatsu SANARIYA Atsushi	81

(22)	Replacement of RC Slab at Otani Bridge under the Condition of Open to Traffic	ENOUE Shinsuke AKAGI Wataru ITO Tsuyoshi SHIJI Akio	85
(23)	Construction of Kanetsu Expressway Matsukawa Bridge Deck Replacement Work	MIYAMOTO Takuma KOJIMA Takuya TSUDA Hisashi SUZUKA Yoshikazu	89
(24)	Floor Slab Renewal in Yatomi Viaduct - Rapid Work in Replacing Half Section Floor-	MARUTA Masaharu KANAMOTO Taketo YOSHIKAWA Masahito TOMINAGA Takayuki	93
(25)	Deck Slab Replacement for PC Continuous Composite Girders -Chuo Expressway Nakatsugawa Bridge-	TERASHIMA Yohei KOBOTA Goki GOTO Kenji MITAMURA Kenji	97
(26)	Construction of ENO BRIDGE (Down Line) Slab Replacement by Slab Erection Machine	OBAYASHI Atsuhiro KOBAYASHI Tsubasa KITSUGI Katsuhiko SATOU Takayuki	101
(27)	Design and Construction for Replace the Floor Slab of Shogawa Bridge on Hokuriku Expressway	SAIMYO Kana KOSAKA Hiroshi SHINOZAKI Eiji TAMURA Kazuhiro	105
(28)	Design for Replace the Floor Slab of GEJYOUGAWA BRIDGE on HOKURIKU Expressway	HOSOKI Satomi KOSAKA Hiroshi SHINOZAKI Eiji TAMURA Kazuhiro	109
♦(29)	Analytical Study on Salt Removal in Concrete by Hygroscopic Aqueous Solution	KITANO Yuichi JINNAI Mao ONOE Kaoru UTSUMI Hideyuki	113
♦(30)	Experimental Study on the Mechanical Properties of PC Steels Corroded Electro-Chemically	TANAKA Yasushi OSADA Koji NOJIMA Syoji	117
♦(31)	Factors Caused by Freezing of Accumulated Water in the PC Sheath on Concrete Surface Cracks	HISAKAWA Kaori KONDOU Takuya YOKOTOBI Shota NISHI Hiroshi	123
♦(32)	Examination of Appropriate Air Volume for Concrete Slabs Considering Freeze-Thaw Resistance and Fatigue Resistance	SATO Eiji OYAMADA Tetsuya NAKAMURA Toshiyuki KUDOU Kaname	129

	Research of PC Girders Repaired by the Steel Plate Bonding Method	ONOZUKA Toyoaki KITANO Yuichi SUGIE Masaki KANDA Hiroshi	135
(34)	Research on the Chloride Ion Concentration Distribution after the Surface Treatment Method Construction	SUGIE Masaki KOSEDO Hiroki YAMAMOTO Susumu TSUKAZAKI Shota	139
(35)	Verification Related to the Construction of the Surface Penetrasion Method Using the Existing PC Girder	KUNITOMI Yasushi SAKAGUCHI Naohiro KOBAYASHI Shu SHIRAHAMA Hiroshi	143
(36)	Applied Report of the Electrochemical Chloride Removal of Prestressed Concrete Box-Girder Bridge	TAWARA Tsukasa MAEDA Yoshifumi NAKAUNE Koushi TOKUMITSU Suguru	147
(37)	Examination of Applicability of Desalination Method Using Linear Anode Material to PCT Girder	AOYAMA Toshiyuki FUKAGAWA Naotoshi SHIRAMIZU Yuichi OHASHI Gaku	151
(38)	Chloride Ion Penetration Properties of Mortar which Mixed in an Aluminosilicate and Blast-Furnace Slag	NAKAHARA Kazuhiko TAWARA Michikazu UCHIDA Satoshi YASUI Wataru	155
(39)	Construction Report of an Office Building Using a U-shaped PCaPC Canopy on the Facade	IMAMURA Masayoshi WACHI Yoshinori TAKAHASHI Motoyuki	159
(40)	Construction Report of Tarusaka Distribution Reservoir	KOIDE Youichi KITASE Akihira ITOU Tomoki	163
(41)	Design and Construction of a Self-propelled Multi-storey Car Park Built by PCaPC	TAKENAKA Hideki WATANABE Tomohiro MOTOUME Ryuuji TSUNEKAWA Hiroyasu	167
♦(42)	Reinforcing Steel Design behind Anchorage of Prestressed Concrete Beam Post-tensioned at Widened Beam End	TANI Masanori MATSUNAGA Kentaro TANO Kenji	171
(43)	Comparison of Time History Response Analysis and Seismic Response Evaluation by Limit Strength Calculation	WAKI Shota MIMURA Kiyotaka KITAHARA Takashi	177
(44)	National Sanatorium Hoshizuka Keiaien Elevated Water Tank Renewal Maintenance Work Construction Report	ITO Yasuo YAMADA Shin NAKAHARA Susumu HIRAI Tuyoshi	181

(45)	Report on Lateral Bucking Restraint Experiment of Inverted T-shaped Synthetic Floorboard Corresponding for Steel Structure	ODA Shotaro HAMAMOTO Tetsuji TAKESHITA Osamu MORITA Akira	185
(46)	Construction Report of TsugaruShariki Reservoir Construction Work	MOURI Hiroshi KUBOZONO Makoto	189
(47)	Construction Report of Kabutoyama Low Ward No. 2 Distribution Reservoir	AKAZAWA Kazuki SAKATA Ryuhei KAJIYAMA Shinobu	193
(48)	Construction Report of Laboratory	YABE Yutaka HAMAMOTO Tetsuzi YOSHIMURA Makoto	197
(49)	Design and Construction of Ibaragawa Bridge on the Joban Expressway	ONO Kanta SATO Naoki ABE Masaya KITAGAWA Yuji	201
(50)	The Construction of Kumuradaiichi Viaduct by Using Infrastructure DX	TOMONARI Hiroki MATSUNAGA Kenichi TOMITA Takashi WAKABAYASHI Yoshiyuki	205
(51)	Construction of Four Span Continuous Prestressed Concrete Box Girder Bridge -Date Bridge, Tohoku-Chuo Expressway-	HORI Ohka SATO Chizuru OHASHI Toshiki SAKURAI Takahisa	209
(52)	Construction of Hokuriku Shinkansen Hosotsubo Bridge, the Longest Span of All the PC Extradosed Bridges in Shinkansen	SAITO Masahide SHINDO Yoshinori YAMADA Satoshi SATO Takahiro	213
(53)	Design and Construction of Corrugated Steel Web Bridge to Accelerated the Process: Niida River Bridge of Joban Expressway	SHIMOKAZE Emiko CHISAKA Toshiharu MATSUZAKI Kota FUJITA Hidenori	217
(54)	Construction Report of AIGAWA DAM 7TH BRIDGE	KAGEYAMA Mikihiro TOMINAGA Satoshi HAMASU Yoshinobu	221
(55)	Design and Construction of Hokuriku Shinkansen Asuwagawa Bridge	TANITA Soichiro YAMANE Hidenori TAKASAKI Taichi MASUDA Ryuta	225
(56)	High-strength Concrete Long-distance Pumping Test Report of Kinosaki Bridge	KUWANO Kana FUJIWARA Toshiaki YANAGIDA Hayami HIRATA Noritake	229

(57)	Development for Precast Segment Geometry Control System and Its Practical Testing in Ongoing Bridge Project	TETSURA Shuta SASAKI Yusuke SHIRAHAMA Hiroshi YAMAGUCHI Tsunehisa	233
(58)	Construction Report of Otogeyama Bridge	KOIKE Michika TANAKA Shinya ARAI Kento ISSHIKI Wataru	237
(59)	Development of PC Bridge Superstructure CIM System Capable of Construction Management by ICT Technology	KAMEI Yukimasa YASUDA Keiichi WAKABAYASHI Yoshiyuki TOMITA Takashi	241
(60)	About The Advancement of Remote Inspection and Bar Arrangement Inspection Using BIM/CIM	YASUDA Keiichi WAKABAYASHI Yoshiyuki TOMITA Takashi	245
(61)	Study on Reinforcement Measurement Accuracy of Bridges Using Image Analysis Techniques and MR Techniques	WAKABAYASHI Yoshiyuki YASUDA Keiichi TSUJII Hiroshi KONNO Koji	249
(62)	Advanced Quality Control for PC Hollow Slab Bridges Using BIM/CIM	KOBAYASHI Shu FUJIMOTO Mieko KUNIMITSU Masaharu AKAMATSU Teruo	253
(63)	Labor Saving of Construction Management with ICT	OKAMOTO Nari HATAE Hirakazu YOSHINO Yuma MIZUTA Taketoshi	257
(64)	Development of System And Devices That Fully Automate Measurement for Structures	TAKAOKA Rei UCHIBORI Hiroyuki FUJIOKA Taisuke	261
(65)	Report on ICT Construction Work at The Surface of MATSUURA NO. 6 BRIDGE	HIGA Aoi NIWA Katsuto MAEKAWA Kazuhiro FUKUSHIMA Kuniharu	265
(66)	BIM/CIM Utilization Construction Report of The Toyooka IC OFF Lamp Bridge	NISHIMURA Kazuki UEDA Masayuki MOTOMURA Yousuke UNIGAME Kazuhiro	269
(67)	Bridge Design and Construction Plan Untilizing CIM of Kizugawa Bridge	ISHIHAMA Tatsuya YOSHIOKA Masayuki ATARASHI Koyuki YAMAGUCHI Takanori	273
(68)	Approach to Productivity Improvement about Design of Precast PC Floor Slab	KIRIKAWA Kiyoshi UEMURA Norio FUJITA Tomotaka TAKATA Nobuaki	277

(69	Design and Construction to Replace Floor Slab of the Tomei Expressway Osawa Bridge and Kajiyashiki Third Bridge	TANIGUCHI Hirotsugu KANAYAMA Hayato MATSUI Yoshiaki NISHIMURA Kazuhiro	281
(70	Report of Floor Slab Replacement in Sakawa-gawa Bridge	NAKAMURA Masayuki KANADA Haruka NISHIMURA Kazuhiro TANIGUCHI Hirotsugu	285
(71	Loading Test During the Construction Period of Otani Bridge Using the Lane-by-Lane Replacement of Floor Slabs	KAWABATA Tomoaki MORII Kouji OKUNO Hiroshi MATSUKANE Tetsuya	289
(72	Construction Example by Half-Section Replacement (of RC Slab) on Night	NISHIKAWA Yusuke TAKANO Yasuhiro AMAGASA Yasunobu KUGIMIYA Akikazu	293
(73	The Development and the Design of the Nightly Half-Section Deck Replacement Technology	NAKADA Takafumi MURANAKA Makoto IWAKI Takayuki MURAKAMI Takahiro	297
(74) Design of Replacement PC Slab at KUZURYUGAWA Bridge of Hokuriku Expressway	WATANABE Emi SHIMADA Toshihide SATO Yuji KAWABE Shusaku	301
(7) Design of Steel/Concrete Composite Deck Slab Connection Structure in Deck Slab Replacement	MURAKAMI Rikiya KUSANO Ariha SHIMONO Seiya	305
(7	Making Efficient of Construction Management Using ICT Systems for Bridge Deck Replacement Project	NINOMIYA Takeshi KANDA Ginpei HOSAKA Hiroki ABE Shingo	309
(7	Report on Slab Replacement at Koki Bridge on the Okinawa Expressway	MAKINO Shouhei WAKISAKA Hideo KOMATANI Daizou IMAMURA Mitushi	313
(7	B) Design and Construction for Floor Slab Replacement Using Replacement Working Machine of Slabs of Tomizawadaini Bridge on the Tomei Expressway	ADACHI Kotaro KANADA Haruka KANAYAMA Hayato ABE Singo	317
♦(7	Expansion Distribution of T-Type Cross Section CPC Beam with Asymmetric Cross Section on the Pre-Cast Web	NISHIZAKI Tatsuya LI Chunhe SUHARA Kentaro TSUJI Yukikazu	321
♦ (8	D) Expansion and Compressive Strength of Mortar with Expansive Additive for Difference Temperature	WATANABE Akio DOMON Hiroyuki	327

(81)	Consideration About Thermal Stress of Precast Prestressed Concrete Members Using Fly Ash	MITO Kensuke SUZUKI Satoshi KITANO Yuichi	331
(82)	Effects of Free Fall Height on the Qualities of High-Fluidity Concrete with Compaction	TSUTAGAWA Masaki KAWAKANE Hajime UJIKE Isao HARADA Taketo	335
♦(83)	An Evaluation Method for the Chloride Resistance of Concrete Based on Electrical Resistivity at Early Ages	KOTABE Takanori SAKURABA Hiroki SUZUKI Masahiro KOGA Hirohisa	339
♦(84)	The Influence to Temperature Environment of Fresh Properties and Strength Development for Concrete Using Admixture with High Early Strength	SHIINO Aoi NAKASE Hirokazu SUZUKI Masahiro	345
♦(85)	Ultra-Low Shrinkage and High-Strength Fiber Reinforced Concrete Using FNS with Drying Conditions	ONDA Yousuke SASAKI Wataru DAI Akiyoshi MATSUDA Taku	351
♦(86)	Rheological Property of Cement Paste with Clay Aqueous Dispersion	FUJIMOTO Mayo MIYAJIMA Akira KIMURA Hiroshi KUNIEDA Minoru	357
♦(87)	Fresh and Hardened Properties of Concrete and Mortar with Clay Aqueous Dispersion	MIYAJIMA Akira LE Van Tri KIMURA Hiroshi KUNIEDA Minoru	361
(88)	Conceptual Design of NAKATSUGAWA Bridges over the Fault Fracture Zone	WAKABAYASHI Dai YAMAGUCHI Takeshi NAKATSUMI Kenichi KAWANE Masaya	367
◇(89)	Applicability of Steel-Concrete Mixed Girder Bridges to Railways	YAWATA Taichi SAITO Masamichi TSUTSUI Kohei ISHIKAWA Taro	371
(90)	Plan and Design of Kinosaki Bridge	INAGAKI Takahiro SHIBUYA Tomohiro	377
(91)	Design of Concrete Web Box Girder Bridge with Ribbed Slab Structure	KUROSAWA Masashi FUKUDA Masato ISHIMURA Masaya IMAEDA Takuya	381
(92)	Design and Manufacture of Joyo Second Viaduct -Precast Segment Method-	TAKECHI Ai GOTO Tomokazu TOKUTSU Moeka OMURA Takafumi	385

(93)	Construction of Precast Segments Bridges over Rivers	TSUCHIDA Ryo MURAI Yu AOYAMA Tatsuhiko YAMASITA Yasutaka	389
	Construction of the Tokushima Expressway Bessodani Bridge Using an Ultra-High Durability Bridge	FUJIOKA Taisuke ABE Hiroyuki ASHIZUKA Kenichiro NAGAMOTO Naoki	393
	Design and Structural Verification of External Prestressing Cable Deviator of Ultra-High Durable Bridge	OKANO Masashi FUJIOKA Taisuke WADA Yoshinori	397
(96)	Development of Rationalized Anchorage Structure at the Main Tower of Extradosed Bridge	KOBIRA Kenta NAKATSUMI Kenichi YAMAGUCHI Takeshi WAKABAYASHI Dai	401
♦(97)	Non-Destructive Evaluation of Bending Stress Loading on Concrete by Multichannel-Impact-Elastic Wave Method	YAMAMOTO Syaira UCHIDA Shinya FUJII Sota ITO Hajime	405
(98)	Rupture Detection of PC Strands at Old Benten-Oohashi: Non-Destructive Inspection by Leakage Magnetic Flux Method	NIIYAMA Masashi MORITA Hiroshi HASHIMOTO Yoshiyuki TANAKA Yasushi	409
(99)	Examination of Applicability of Cavity Amount Estimation by Vacuum Method for Grout Filling Shortage	UEHARA Reiji YAMAUCHI Taketoshi UETO Kenji NISHIMURA Katsunori	413
♦(100)	Using Deep Learning for Void Detection in Grout-Filled Sheath Tube	OKAZAKI Shinichiro OKAZAKI Yuriko NISHIMURA Nobuhiko SHOJI Akio	417
(101)	Labor-Saving Management System and Method of Finished Shape Utilizing an Information Processing Technology in Seppugawahashi-higashi Construction	NAKAMURA Masaki MIZUGUCHI Daisuke OSANAI Katsunori MIYAKOSHI Ryo	423
(102)	Report on Soundness Monitoring of PC Girder Bridge Using IoT Sensor System	MACHI Tsutomu KATAGIRI Mitsuyoshi KASAI Toshiki	427
(103)	Investigation Report on the Load-Bearing Performance of PC Hollow Slab Bridge Craking Perpendicular to the Bridge Axis	MATSUI Shungo SUZUKI Shin NAKAMURA Hiroshi KISHIMOTO Shinki	431
(104	Countermeasures Concerning Hot Weather Concrete in SUE VIADUCT	ITO Keita TAKAHASHI Mitsushige KASIMA Yasuyuki	435

(105)	Measures for Improving Concrete Quality of PC Through Girder with Circular Haunch and Diagonal Web	YOSHITAKE Ryousuke FUKATA Tomohiro UTA Tomomi YAMADA Norihiro	439
(106)	Static and Dynamic Load Testing for Structural Performance Evaluation of the Non-Metallic PC Bridge	HOANG TRONG Khuyen NONAMI Yuuji WADA Yoshinori MATSUO Yusuke	443
♦(107)	Experimental and Analytical Investigation on Strength of Inclined Loop Joint	OGATA Rintarou HATAKEYAMA Shigetada HAMADA Hidenori SAGAWA Yasutaka	447
♦(108)	Pull-Out Test Focusing on Narrow Joint of PCa Concrete Slabs with Loop Splice Joint	BABA Shotaro FUJIKURA Shuichi UEKI Seigo MURAI Hiroyasu	453
♦(109)	Bond Strength of Concrete to Non-shrinkage Mortar and Flexural Strength of Concrete Joint	TAKAGI Yusuke JUAN Yujou YAMAMOTO Takashi	457
♦(110)	Stress Transmission Performance of Precast Slab Joint Structure Using Plate Anchored Reinforcement Bars	SHIMAZAKI Toshitaka KAWAGUCHI Tetuo TAKEDA Hitoshi ZHAO Yuiken	463
♦(111)	Examination of Application of Strengthening System Using Post-Tension Tendon with an Internal Anchorage to Low-Strength Concrete Members	MIHARA Takafumi KAWAKANE Hajime MIMOTO Tatsuhiko	469
♦(112)	A Study of Jointing for Reducing Dowel Holes between a UFC Deck Slab and Steel Girder	NAGAI Yusuke ICHINOMIYA Toshimichi KOSHINO Mayaka SUZUKI Hideyuki	475
(113)	Fatigue Durability of Splice Joint Structure Using Ultra-Low Shrinkage and High Strength FRCC for Precast Deck Slab	TAKEYAMA Tadaomi NAKAMURA Masayuki MATSUDA Taku NISHIMURA Kazuhiro	481
(114)	Construction Experiment of PCa Joint Between Precast Slabs Using Ultra Low Shrinkage High Strength Fiber Reinforced Concrete	DAI Akiyoshi SASAKI Wataru SAKAMOTO Ryou HIGUCHI Masanori	485
(115)	Design Considerations on the Application of Plate-Anchored Reinforcement Bars in the Joint Structure between Precast PC Slabs	TAKAHASHI Yusuke KAWAGUCHI Tetsuo KIDO Yasuhiko SHIMIZU Takafumi	489
(116)	Report of Practical Confirmation Test of PC Grout with Thixotropy	ITOH Hiraku FUJIWARA Hiromi SUGAWARA Akira NOCHIDE Hiroshi	493

(117)	without Heating and Enclosures	SUZUKI Atsuro INOUE Masumi HOSHI Hiroo YOSHIOKA Kenichi	497
(118)	Construction of the PC Grout which Improved Durability Performance and Cold-Resistant Performance	AKAGAWA Takuya OSADA Masahiro MOTOI Nobuyuki NAKAMURA Masaki	501
♦(119)	Fracture Mechanics Properties of Steel Fiber Reinforced Concrete with Shrinkage Reducing Agent	YASUDA Eiki KONO Katsuya KURONO Jotaro MURAOKA Toshihide	505
(120)	Abrasion Resistance of Fiber Reinforced Porosity Free Concrete	OCHIAI Takao MIZOGUCHI Manami KISHIRA Ryo KONO Katsuya	511
(121)	Design Value for Creep Coefficient of Concrete with Considering Cement Type	NAKAMURA Mami WATANABE Ken	515
♦(122)	Applicability of Concrete with Granulated Blast-furnace Slag Sand to PRC Track Slab	KAWAKANE Hajime SASAKI Mitsunori MASUDA Tatsuya TOYOTA Tetsuya	519
♦(123)	Application Evaluation of Silicate Type Surface Penetrants on Concrete Mixed with Steam Curing Blast Furnace Slag Fine Powder	KONDO Takuya FUTAGAMI Kei YOKOI Katsunori MIMOTO Tatsuhiko	525
(124)	Consideration of Design Method Incorporate with Long-tarm Changing Statically Indeterminate Force of PC-type GRS Integrated Bridge	SHINDO Yoshinori TODOROKI Shuntaro TSUCHIYA Satoshi	531 ·
(125)	Examination of Chloride Content Survey Method for PCT Girder- bridge in Chloride Attack Environment	AZUMA Yosuke KITANO Yuichi YAMAMOTO Susumu ISHIDA Masahiro	535
♦(126)	Mock-up Experimental Study on the Tensile Stress Behavior of the Remaining PC Tendons at the Fracture Point of Grouted PC T-girder	ONO Kiyohisa NOJIMA Shoji OSADA Koji TANAKA Yasushi	539
(127)	Study on Calculation Method of Resisting Bending Moment to Failure of PC Girder Considering Damage	TSUKAZAKI Shota YAMAMOTO Susumu ISHIDA Masahiro MIMOTO Tatsuhiko	545
(128)	Construction Report of Multi-diameter Connecting T-girder Bridge (Yata 3rd Bridge) Indirectly Supported by PCa Cross Beam	SEKI Masafumi TOYOTA Yusuke OKUYAMA Yohei FUJIWARA Toshiaki	549

(129) E	Execution Report of Silinoyakata Bridge	YAMADA Tatsuya FUJIMATSU Kazuhisa ICHIHARA Ryuji MINATO Takafumi	553
(130)	Planning of Drilling and Measurement for Seimic Retrofitting Work of PC Bridge Using Post-installed Anchor bolts in Concrete	MYOUJIN Yuki OTA Akira OKUBO Takashi YAMASHITA Shinji	557
(131)	About Damage Countermeasures that Occurred in the Old PCT Girder Bridge Horizontal Tightening Fixing Part	NOMURA Hajime	561
	Study on Bending Over Stress of External Cable Reinforced PC Girder	JINNAI Mao MIHARA Takafumi TANAKA Shiya KITANO Yuichi	565
(133)	The Hokuriku Shinkansen, Tsuruga Station Viaduct Construction of the Others, Construction of PC Gider in Maizaki Bv (Ctp1)	NAKAYAMA Takahiro KASHIWAGI Ryou KANAYA Eiji TERASAKI Masanao	569
♦(134)	Repair Effectiveness of PC Grout Re-Injection on Highways under Anti-freeze Sprayed Environment	KAMOTANI Tomoshige MATSUI Takayuki YASUZATO Toshinori SAMIZO Junichi	573
(135)	Planning and Design of Aseismic Reinforcement and Replacement of Bearings in PC Continuous Hollow Slab Bridge	t UMEDA Takaaki MARUYAMA Naoto KODAMA Ryota OKUBO Takashi	577
(136)	Construction Report of YANAI Bridge (Carbon Fiber Plate Tendor Reinforcement)	n HASEGAWA Teruaki YAMAZAKI Tuyoshi NARUKAWA Akihiro HIGAMI Toshio	581
(137)	Basic Experiments of Countermeasures Used Polyurea Resin . Against Protrusion of Vertically Tightened PC Bars	FUKAYA Takahisa ISHIDA Kazuhisa SATO Yusuke YAMADA Masatoshi	585
(138)	Research of Prestressing Tendons for PCT Girders 19 Years after Desalination	n MASAKI Mamoru NAKAMURA Fumika SASAKI Takashi MIYAZATO Shinichi	589
(139	Examination of Stress around the Opening for Cutting Tension Material in PC Intermediate Fixing System	IMAMURA Tadaki WATANABE Hirofumi MORIISHI Yoshihisa	593
(140	A Study on the Connection Structure of the Intermediate PC Fixation System	WATANABE Hirofumi MORIISHI Yoshihisa KAWAGUCHI Chihiro	597

	Bridge Using Precast Slab -Hokuriku Expressway Takanogawa	SATOU Hideya INABA Naofumi MATSUGUCHI Daisuke YUASA Takuo	601
♦(142)	Application of Concrete Using Granulated Blast Furnace Slag for Widening Work of PC Bridge	HASHINO Tetsuro KAWANAKA Ryoichi TANNO Atsushi FUKUDA Masato	605
(143)	Replacement of External Cables by Early Contractor Involvement	MORI Syota TANAKA Kouji IWANE Hideyoshi IMOKAWA Toshihide	611
♦(144)	The Development of Design and Construction Technology for Precast PC Slabs for Bridges with Cotter Joints	WATANABE Teruyasu SAKURAI Masayuki HARA Kengo DABARU Takehiro	615
♦(145)	Study on the Replacement Method of Slabs for PC Composite Girder Bridges	HARA Kengo MIYAZATO Shinichi INABA Naofumi FUKUSHIMA Kazutaka	621
♦(146)	Load Carrying Characteristics of Precast Slab Joint Structure Using Plate Fixing Type Rebar	KAWAGUCHI Tetsuo SHIMAZAKI Toshitaka TAKEDA Hitoshi ZHAO Weijian	625
♦(147)	Longitudinal Tendon Layout for UHPFRC Deck Slab with Variable Width	KOSHINO Mayaka SUZUKI Hideyuki FUJISHIRO Masaru NAKANISHI Masatsugu	631
(148)	Edge Processing Technology of Precast Prestressed Concrete Slab	S SAITOH Hirotoshi MIZUMASA Shinji KAMIO Hidenori YOSHIOKA Kenichi	635
(149	Experimental Construction of Long Length (100m) AFRP Rod for Ultra High Durable Slab	or SHINOZAKI Hiroo MATSUO Yusuke WADA Yoshinori UCHIBORI Hiroyuki	639
(150	Construction and Structural Performance Verification of Ultra Hig Durable Slab by a Real Scale Model Test	gh MATSUO Yusuke WADA Yoshinori KARINO Takeshi RANKOTH Chamila Kumara	64
(15)	Examination of Fatigue Durability of Deck Joint Structure Excluding Formwork	HIRAI Takahiro TAKEYAMA Tadaomi NISHIMURA Kazuhiro MAKINO Takuya	64

		4	
(152)	Wheel-Moving Fatigue Test of a Real-Scale Bridge Slab Jointed with Prestressing Joints	HAYASHI Daisuke OHTA Tomohisa AOKI Yasumoto TANAKA Masato	651
(153)	Fatigue Durability of Precast Floor Slab Joint Structure Using UFC	TOMINAGA Takayuki IWAKI Takayuki SASAKI Kazunari NIIKURA Ichirou	655
♦(154)	Evaluation of Response Characteristics of Longitudinal Sleeper Tarcks to Impact Loads	WATANABE Tsutomu MINOURA Shintaro MATSUOKA Kodai GOTO Keiichi	659
♦(155)	Research on Damage Control by Joint Conditions of PCaPC Columns	IKUTA Ami MIKI Tomohiro	665
◇(156)	Analytical Evaluation of the Effect of the Damaged PC Steels on the Load Bearing Mechanism of PC Beams	DADABOEV Akhror KOIKE Takashi ITOH Atsushi	671
(157)	Effect of Shear Span Ratio on Shear Behavior of PC Beams with High Strength Lightweight Concrete Type 1	WATANABE Takumi MIZUKOSHI Mutsumi MITA Takehiro YOKOHATA Katsuhiko	677
♦(158)	Proposal of a New Core Truss Structure and Its Structural Characteristics	NAKAGAWA Shunichi SEKI Fumio HASEGAWA Yudai	681
♦(159)	Studies on Formulation of Nonlinear Elastic Flexure and Seismic Limit States of Prestressed Concrete Structures	IKEDA Shoji KUROSAWA Ryouhei	687
♦(160)	The Effect of Different Application Conditions of Water Absorption Regulators on the Adhesion Properties of Vertical Joint Surfaces	YOSHITSUGU Yusuke MIDORIKAWA Takehiko TAKAHASHI Koutaro MASAKI Mamoru	693
(161)	Effect of Concrete Finishing Method on Surface Workmanship and Properties	YAMADA Koji KURIHARA Yuki TANIGUCHI Masateru AMAYA Kimihiko	699