

● Samples in Stage I (duration: 1983-1999; Sample number 99)

No.	Seminal paper (title)	Publication Year	Labels	Label compositions		
1	Arc Welding Robot Systems for Large Steel Constructions	1983	$Tc_{172}A_{54}$	$s_{11}$	$cc_{12}$	-
2	Walking Robot for Underwater Construction	1983	$Tc_{181}A_{55}$		$cc_2$	-
3	Arc Welding Robot with Maximum Flexibility for Large steel construction	1984	$Tc_{237}A_{54}$	$s_{11}$	$cc_{120}$	-
4	Application of Intelligent Robot Arc-Welding System to Large-sized Steel Construction	1985	$Tc_{236}A_{54}$	-	$cc_8$	-
5	Robotized Welding of Large Offshore Constructions	1986	$Tc_{171}A_{54}$	-	$cc_{13}$	-
6	Blockbot: A robot to automate construction of cement block walls	1988	$Th_9A_{11}$	$a_4$	$b_{15}$	$ch_2$
7	Using robots in the tubular structural constructions	1988	$Th_{25}A_{54}$	-	$b_{67}$	$ch_2$
8	Development of positioning systems for autonomous robots on construction sites	1989	$Tc_{43}A_{14}$	$s_{125}$	$cc_{120}$	-
9	Application of robotics in bridge deck fabrication	1989	$Te_{14}A_{54}$	-	$ce_{14}$	-
10	A concept of control system for construction robot	1989	$Th_{157}A_{50}$	-	$b_{52}$	$ch_3$
11	Pipe manipulator enhancements for increased automation	1989	$Th_{35}A_{21}$	$a_2$	$b_2$	$ch_6$
12	A master-slave manipulator for excavation and construction tasks	1989	$Th_{141}A_7$	$a_4$	$b_{12}$	$ch_6$
13	Framework for construction robot fleet management system	1990	$Tc_{97}A_{31}$	-	$cc_{42}$	-
14	Automation and robotics for road construction and maintenance	1990	$Tc_7A_1$	$s_{65}$	$cc_{63}$	-
15	Robots and automated systems for the civil and construction industries	1990	$Th_{35}A_7$	$a_2$	$b_2$	$ch_6$
16	Position-force adaptive control of a robot with applications in construction	1991	$Tc_{19}A_{50}$	$s_{33}$	$cc_{36}$	-
17	Automation of surface treatment in construction by using a robot	1991	$Tc_{11}A_{20}$	$s_{34}$	$cc_{36}$	-
18	Construction robot fleet management system prototype	1991	$Tc_{97}A_{31}$	-	$cc_{42}$	-
19	SSR: a mobile robot on ferromagnetic surfaces	1992	$Tc_{115}A_4$	$s_{76}$	$cc_{95}$	-
20	Air-Force Construction Automation Robotics	1992	$Th_{62}A_7$	$a_2$	$b_2$	$ch_1$
21	A remotely operated building inspection cell	1992	$Th_{156}A_6$	$a_3$	$b_{12}$	$ch_1$
22	Automation of Concrete Slab-on-grade Construction	1992	$Th_{123}A_{31}$	$a_2$	$b_{52}$	$ch_2$
23	Robotic materials handling for automated building construction technology	1992	$Th_{61}A_{29}$	$a_5$	$b_{27}$	$ch_2$
24	Outpost Service and Construction Robot (OSCR)	1992	$Th_{157}A_{47}$	-	$b_{52}$	$ch_3$

25	Object-oriented programming in robotics research for excavation	1992	$Th_{36}A_7$	$a_3$	$b_{12}$	$ch_6$
26	Real-time robot path planning using the potential function method	1993	$Tc_{82}A_{24}$		$cc_{33}$	-
27	Position-force adaptive control for construction robots	1993	$Tc_{64}A_{20}$	$s_6$	$cc_{38}$	-
28	Managing multiple construction robots with a computer	1993	$Tc_{97}A_7$	-	$cc_{42}$	-
29	Model-based guidance by the longest common subsequence algorithm for indoor autonomous vehicle navigation using computer vision	1993	$Tc_{106}A_{32}$	$s_{39}$	$cc_{52}$	-
30	Map representation of a large in-door environment with path planning and navigation abilities for an autonomous mobile robot with its implementation on a real robot	1993	$Tc_{80}A_{24}$	$s_{10}$	$cc_{65}$	-
31	Full-scale building with interior finishing robot	1993	$Th_{33}A_{20}$	$a_3$	$b_{21}$	$ch_2$
32	Prototype robotic masonry system	1993	$Th_{39}A_{22}$	$a_3$	$b_{55}$	$ch_2$
33	Artificial intelligence in the control and operation of construction plant-the autonomous robot excavator	1993	$Th_{142}A_7$	$a_4$	$b_{12}$	$ch_2$
34	Articulated multi-vehicle robot for inspection and testing of pipeline interiors	1993	$Th_{126}A_6$	$a_5$	$b_2$	$ch_2$
35	Automation potential of pipe laying operations	1993	$Th_{36}A_{21}$	$a_3$	$b_{12}$	$ch_6$
36	Self-Position Measuring Method for Moving Robot Working at Construction Sites	1994	$Tc_{13}A_{14}$	-	$cc_{115}$	-
37	Logistics Support System for Construction Robotics Implementation	1994	$Tc_{97}A_{48}$	-	$cc_{42}$	-
38	Study on Active Vibration Control of Arm for Construction Machinery – Modeling and Linear-control simulation	1994	$Tc_{87}A_{50}$	-	$cc_5$	-
39	Path planning and sensing for an experimental masonry building robot	1994	$Tc_{75}A_{22}$	$s_{74}$	$cc_{73}$	-
40	Construction robot force control in cleaning operations	1994	$Tc_{137}A_{45}$	$s_{50}$	$cc_{79}$	-
41	Air Force construction automation/robotics	1994	$Th_{151}A_{21}$		$b_{52}$	$ch_1$
42	Mobile robot for on-site construction of masonry	1994	$Th_{40}A_{22}$	$a_2$	$b_{56}$	$ch_2$
43	A mobile robot for on-site construction of masonry	1994	$Th_{40}A_{22}$	$a_2$	$b_{56}$	$ch_2$
44	Application specific realisation of a mobile robot for on-site construction of masonry	1994	$Th_{19}A_{22}$	$a_2$	$b_2$	$ch_2$
45	A robotic manipulation for inspection and maintenance of tall structures	1994	$Th_{98}A_6$	$a_3$	$b_{19}$	$ch_2$

46	Modularity of PRM type cartesian robots and their application in the production of construction materials	1994	<i>Th<sub>13</sub>A<sub>29</sub></i>	<i>a<sub>3</sub></i>	<i>b<sub>7</sub></i>	<i>ch<sub>2</sub></i>
47	Robotics and automation in the construction of the sliding domes of King Fahd's extension of the prophet's holy mosque in Madinah, Kingdom of Saudi Arabia	1994	<i>Th<sub>60</sub>A<sub>34</sub></i>	<i>a<sub>3</sub></i>	<i>b<sub>12</sub></i>	<i>ch<sub>2</sub></i>
48	Robot for interior-finishing works in building: Feasibility analysis	1994	<i>Th<sub>22</sub>A<sub>58</sub></i>	<i>a<sub>3</sub></i>	<i>b<sub>32</sub></i>	<i>ch<sub>2</sub></i>
49	Requirements for application of robotics and automation in highway maintenance and construction tasks	1994	<i>Th<sub>25</sub>A<sub>53</sub></i>	-	<i>b<sub>67</sub></i>	<i>ch<sub>2</sub></i>
50	Construction process simulation with rule-based robot path planning	1994	<i>Th<sub>23</sub>A<sub>24</sub></i>	-	<i>b<sub>32</sub></i>	<i>ch<sub>2</sub></i>
51	On the dynamic control of a hydraulic large range robot for construction applications	1995	<i>Tc<sub>51</sub>A<sub>50</sub></i>	<i>s<sub>22</sub></i>	<i>cc<sub>10</sub></i>	-
52	A behavioral language for motion planning in building construction	1995	<i>Tc<sub>84</sub>A<sub>24</sub></i>	-	<i>cc<sub>103</sub></i>	-
53	Robotics in highway construction & maintenance	1995	<i>Te<sub>2</sub>A<sub>53</sub></i>	-	<i>ce<sub>2</sub></i>	-
54	First results in autonomous retrieval of buried objects	1995	<i>Th<sub>124</sub>A<sub>59</sub></i>	<i>a<sub>2</sub></i>	<i>b<sub>12</sub></i>	<i>ch<sub>2</sub></i>
55	High tractive power wall-climbing robot	1995	<i>Th<sub>10</sub>A<sub>11</sub></i>	<i>a<sub>3</sub></i>	<i>b<sub>16</sub></i>	<i>ch<sub>2</sub></i>
56	Conceptual design of a flooring robot: development methodology and results	1995	<i>Th<sub>34</sub>A<sub>20</sub></i>	<i>a<sub>3</sub></i>	<i>b<sub>32</sub></i>	<i>ch<sub>2</sub></i>
57	Automatic assembly of a commercial cavity block system	1995	<i>Th<sub>49</sub>A<sub>34</sub></i>	-	<i>b<sub>36</sub></i>	<i>ch<sub>2</sub></i>
58	New TIG arc welding processes and welding robot for construction of storage tank	1995	<i>Th<sub>25</sub>A<sub>54</sub></i>	-	<i>b<sub>67</sub></i>	<i>ch<sub>2</sub></i>
59	Development of welding robot technology for civil engineering and construction	1995	<i>Th<sub>25</sub>A<sub>54</sub></i>	-	<i>b<sub>67</sub></i>	<i>ch<sub>2</sub></i>
60	Wall assembly robot - its development and its integration in construction management   Mauerwerksroboter - Entwicklung und Integration in die Ausfuehrungs-planung	1995	<i>Th<sub>28</sub>A<sub>11</sub></i>	-	-	<i>ch<sub>2</sub></i>
61	Task planning experiment toward an autonomous robot system for the construction of overhead distribution lines	1995	<i>Th<sub>88</sub>A<sub>44</sub></i>	<i>a<sub>3</sub></i>	<i>b<sub>2</sub></i>	<i>ch<sub>6</sub></i>
62	Integration of CAD drawings and construction robot motion controllers	1996	<i>Tc<sub>84</sub>A<sub>34</sub></i>	-	<i>cc<sub>103</sub></i>	-
63	Construction robot for three-dimensional shapes based on the nesting behavior of paper wasps	1996	<i>Tc<sub>164</sub>A<sub>50</sub></i>	-	<i>cc<sub>114</sub></i>	-
64	Self-position measuring method for moving robot working at construction sites (2nd report, improvement of pillar-detecting algorithm)	1996	<i>Tc<sub>13</sub>A<sub>14</sub></i>	-	<i>cc<sub>115</sub></i>	-

65	Controlled hydraulics for a direct drive brick laying robot	1996	$Tc_{79}A_{22}$	$s_{21}$	$cc_{70}$	-
66	Development of interior finishing unit assembly system with robot: WASCOR IV research project report	1996	$Tc_{116}A_{58}$		$cc_{70}$	-
67	Technological aspects in the development of a mobile bricklaying robot	1996	$Tc_{78}A_{22}$	$s_1$	$cc_{71}$	-
68	Automatic generation of the controlling-system for a wall construction robot	1996	$Tc_{27}A_{11}$	-	$cc_{90}$	-
69	Evolution of an automated crack sealer: A study in construction technology development	1996	$Th_1A_1$	$a_2$	$b_{32}$	$ch_2$
70	Development of a construction robot for marking on ceiling boards	1996	$Th_{59}A_{28}$	$a_3$	$b_{15}$	$ch_2$
71	Automatic task modelling for sewer studies	1996	$Th_{127}A_6$	$a_3$	$b_{36}$	$ch_2$
72	Methods of control for robotic brick masonry	1996	$Th_{41}A_{22}$	$a_5$	$b_{12}$	$ch_2$
73	Compact arc welding robot system for huge construction parts	1996	$Th_{25}A_{54}$	-	$b_{67}$	$ch_2$
74	Development of automated cleaning system for construction aluminum scaffolding boards	1996	$Th_{28}A_{17}$	-	-	$ch_2$
75	Control of construction robots using camera-space manipulation	1996	$Th_{64}A_{50}$		$b_{30}$	$ch_3$
76	Robotic mapping of building interior - Precision analysis	1997	$Tc_{140}A_{46}$	$s_1$	$cc_{121}$	-
77	Steel frame welding robot systems and their application at the construction site	1997	$Tc_{170}A_{54}$	$s_{14}$	$cc_{14}$	-
78	Robot assembly system for the construction process automation	1997	$Tc_{117}A_{34}$	$s_{70}$	$cc_{26}$	-
79	A fuzzy navigation system for mobile construction robots	1997	$Tc_{189}A_{32}$	-	$cc_{26}$	-
80	Feasibility of automating military's environmental operations (tele-operate remote)	1997	$Tc_{189}A_{56}$	-	$cc_{26}$	-
81	Development of a distributed multiple mobile robot control system for automatic highway maintenance and construction	1997	$Tc_{60}A_{53}$	$s_{14}$	$cc_{46}$	-
82	Selection of optimal construction robot using genetic algorithm	1997	$Tc_{33}A_{12}$	-	$cc_{49}$	-
83	The development of a rapid-prototyping technique for mechatronic-augmented heavy plant	1997	$Tc_{121}A_{26}$	$s_{154}$	$cc_{90}$	-
84	Distributed control of a multiple tethered mobile robot system for highway maintenance and construction	1997	$Tc_{42}A_{53}$	$s_{54}$	$cc_{90}$	-
85	Programming construction robots using virtual reality techniques	1997	$Tc_{205}A_{50}$	-	$cc_{92}$	-
86	Vision-based interactive path planning for robotic bridge paint removal	1997	$Tc_{29}A_{12}$	$s_{39}$	$cc_{96}$	-

87	Concept of a robot for interior building trades by the example of wall slits in masonry	1997	$Th_{11}A_{11}$	$a_3$	$b_{17}$	$ch_2$
88	Construction manipulators of steel towers for the transmission of electricity	1997	$Th_8A_8$	$a_3$	$b_2$	$ch_3$
89	A new facility for testing accurate positioning systems for road construction robotics	1998	$Tc_6A_1$	$s_{66}$	$cc_{64}$	-
90	AutoPave: Towards an automated paving system for asphalt pavement compaction operations	1998	$Tc_5A_1$	$s_{67}$	$cc_{65}$	-
91	Automated and robotics-based techniques for road construction	1998	$Tc_4A_1$	$s_6$	$cc_{73}$	-
92	Automation infrastructure system for a robotic 30-ton bridge crane	1998	$Tc_{31}A_{12}$	$s_{94}$	$cc_{96}$	-
93	Development of the construction methods for distribution line materials using a robot system remotely controlled from the ground	1998	$Th_{62}A_{29}$	$a_2$	$b_2$	$ch_1$
94	Development of automated construction system for high-rise reinforced concrete buildings	1998	$Th_{24}A_{17}$	$a_2$	$b_{67}$	$ch_2$
95	Robotic assembly of rebar cages for beams and columns	1998	$Th_{13}A_8$	$a_3$	$b_7$	$ch_2$
96	Robotic welding speeds Olympic Stadium construction	1998	$Th_{60}A_{54}$	$a_3$	$b_{12}$	$ch_2$
97	Construction manipulators for transmission towers	1998	$Th_{106}A_{49}$	-	$b_{49}$	$ch_6$
98	Teleoperation control of ETS-7 robot arm for on-orbit truss construction	1999	$Tc_{200}A_{56}$	-	$cc_{81}$	-
99	Development of a Construction Robot for Marking on Ceiling Boards: 2nd Report, Drawing a Long Straight Line on the Ceiling	1999	$Tc_{70}A_{38}$	-	$cc_{89}$	-

● Samples in Stage II (duration: 2000-2008; Sample number 112)

No.	Seminal paper (title)	Publication Year	Labels	Label compositions		
1	Robot assembly system for computer-integrated construction	2000	$Tc_{118}A_{34}$	$s_{138}$	$cc_{26}$	-
2	Impedance control of a hydraulically actuated robotic excavator	2000	$Tc_{226}A_7$	$s_{44}$	$cc_{43}$	-
3	Process and quality control with a video camera, for a floor-tilling robot	2000	$Tc_{57}A_2$	$s_{39}$	$cc_{61}$	-
4	Automated construction system for high-rise reinforced concrete buildings	2000	$Te_9A_{29}$		$cc_9$	-
5	Tele-operated construction robot using virtual reality - (CG presentation of virtual robot for increasing working efficiency)	2000	$Th_{152}A_{56}$	$a_3$	$b_{67}$	$ch_1$
6	Master-Slave Control for Tele-Operation Construction Robot System	2000	$Th_{151}A_{56}$	-	$b_{52}$	$ch_1$
7	Designing for automated construction	2000	$Th_{12}A_{11}$	$a_2$	$b_7$	$ch_2$
8	Development of a robotic bridge maintenance system	2000	$Th_{19}A_{12}$	$a_2$	$b_2$	$ch_2$
9	Automated cleaning of windows on standard facades	2000	$Th_{96}A_{45}$	$a_3$	$b_{34}$	$ch_2$
10	Development of a teachingless robot system for welding a large-sized box-type construction	2001	$Tc_{169}A_{12}$	-	$cc_{15}$	-
11	Welding automation in space-frame bridge construction	2001	$Th_{112}A_{54}$	-	$b_{11}$	$ch_2$
12	Technological enhancement and creation of a computer-aided construction system for the shotcreting robot	2001	$Th_{32}A_{20}$	$a_2$	$b_{12}$	$ch_3$
13	LAN-based building maintenance and surveillance robot	2002	$Tc_{54}A_{19}$	$s_{118}$	$cc_{115}$	-
14	A framework for rapid local area modeling for construction automation	2002	$Tc_{41}A_{14}$	$s_{39}$	$cc_{56}$	-
15	Automated excavation in construction using robotics trajectory and envelop generation	2002	$Tc_{224}A_7$	$s_{45}$	$cc_{89}$	-
16	Disaster restoration work for the eruption of Mt Usuzan using an unmanned construction system	2002	$Th_{85}A_{42}$	$a_2$	$b_3$	$ch_1$
17	Adaptive control strategy of climbing robot for inspection applications in construction industry	2002	$Th_{128}A_6$	$a_3$	$b_{70}$	$ch_2$
18	Robotic excavation in construction automation	2002	$Th_{143}A_7$	$a_4$	$b_{33}$	$ch_2$
19	Blind Bulldozing: Multiple Robot Nest Construction	2003	$Tc_{95}A_{30}$	$s_6$	$cc_{100}$	

20	Development of a construction robot for marking on ceiling boards (3rd report, prototype of the laser pointer system)	2003	$Tc_{124}A_{38}$	$s_{14}$	$cc_{115}$	-
21	Application of Robots Using Pneumatic Artificial Rubber Muscles for Operating Construction Machines	2003	$Tc_{87}A_{26}$	$s_8$	$cc_5$	-
22	Construction robot path-planning for earthwork operations	2003	$Tc_{144}A_5$	$s_{86}$	$cc_{87}$	-
23	Development of a hydraulic tele-operated construction robot using virtual reality: New master-slave control method and an evaluation of a visual feedback system	2003	$Th_{152}A_{56}$	$a_3$	$b_{67}$	$ch_1$
24	A Tele-operated Humanoid Robot Drives a Backhoe in the Open Air	2003	$Th_{150}A_{56}$	$a_2$	$b_1$	$ch_2$
25	Portable robotic system for steel H-beam welding	2003	$Th_{113}A_{54}$	$a_3$	$b_{10}$	$ch_2$
26	A cleaning robot for construction out-wall with complicated curve surface	2003	$Th_{28}A_{11}$			$ch_2$
27	A remotely controlled robot operates construction machine remote)	2003	$Th_{91}A_{56}$	$a_1$	$b_{67}$	$ch_3$
28	Manipulators help out with plaster panels in construction	2003	$Th_{55}A_{28}$	$a_3$	$b_{36}$	$ch_6$
29	Field test of remote control system for construction machines using robot arm	2004	$Tc_{187}A_{56}$	-	$cc_{31}$	-
30	Development of remote control system of construction machinery using pneumatic robot arm	2004	$Tc_{187}A_{56}$	-	$cc_{31}$	-
31	Analysis of a climbing parallel robot for construction applications	2004	$Tc_{138}A_{45}$	$s_{33}$	$cc_{43}$	-
32	A control architecture for robotic excavation in construction	2004	$Tc_{222}A_7$	$s_{47}$	$cc_{47}$	-
33	Application of GA in optimal robot selection for bridge restoration	2004	$Tc_{33}A_{12}$		$cc_{49}$	-
34	The study of remotely teleoperated robotic manipulator system for underwater construction	2004	$Tc_{182}A_{55}$	$s_1$	$cc_{62}$	-
35	Real-time Sense-and-Act' operation for construction robots	2004	$Tc_{56}A_2$	$s_{54}$	$cc_{62}$	-
36	Spatial model for path planning of multiple mobile construction robots	2004	$Tc_{76}A_{24}$	-	$cc_{73}$	-
37	Balancing human-and-robot integration in building tasks	2004	$Te_{14}A_{35}$	-	$cc_{14}$	-
38	Distance measurement technology development at remotely teleoperated robotic manipulator system for underwater constructions	2004	$Th_{117}A_{55}$	$a_1$	$b_2$	$ch_1$
39	Construction of ceiling adsorbed mobile robots platform utilizing permanent magnet inductive traction method	2004	$Th_{60}A_{28}$	$a_3$	$b_{12}$	$ch_2$
40	Adapting a teleoperated device for autonomous control using three-dimensional positioning sensors: experiences with the NIST RoboCrane	2004	$Th_{26}A_8$	-	$b_{49}$	$ch_2$

41	Automated construction by contour crafting - related robotics and information technologies	2004	$Th_{14}A_{63}$	-	$b_7$	$ch_2$
42	A service robot for construction industry	2004	$Th_{28}A_{11}$	-	-	$ch_2$
43	Automating inspection and documentation of remote building construction using a robotic camera	2005	$Tc_{216}A_6$	$s_{54}$	$cc_{102}$	-
44	A heavy climbing robotic platform for geotechnical applications	2005	$Tc_{26}A_{11}$	$s_{22}$	$cc_{25}$	-
45	Climbing robots with adaptive grippers for construction	2005	$Tc_{23}A_{11}$	$s_{23}$	$cc_{26}$	-
46	A hybrid pole climbing and manipulating robot with minimum DOFs for construction and service applications	2005	$Tc_{93}A_3$	$s_{39}$	$cc_{36}$	-
47	(road) Robotic systems for pavement lane painting operations	2005	$Tc_3A_1$	$s_{54}$	$cc_{67}$	-
48	Graphical simulation of remote control construction robot based on virtual reality	2005	$Th_{107}A_{56}$	-	-	$ch_1$
49	A robotized drilling system for rocky wall consolidation	2005	$Th_{65}A_{60}$	$a_1$	$b_{70}$	$ch_2$
50	Multiconfigurable inspection robots for low diameter canalizations	2005	$Th_{129}A_6$	$a_3$	$b_{74}$	$ch_2$
51	Application of robots for inspection and restoration of historical sites	2005	$Th_{130}A_6$	$a_3$	$b_{70}$	$ch_2$
52	The analysis of the curtain wall installation robot: Based on the test in the construction site	2005	$Th_{28}A_{11}$	-	-	$ch_2$
53	Development of a parallel typed robot with a sensorless observer for harbor construction	2005	$Th_{81}A_{40}$	$a_2$	$b_{49}$	$ch_3$
54	Development of hybrid robot for construction works with pneumatic actuator	2005	$Th_7A_{11}$	$a_5$	$b_{20}$	$ch_3$
55	Example of experimental use of 3D measurement system for construction robot based on component design concep	2006	$Tc_{132}A_{42}$	$s_{14}$	$cc_{109}$	-
56	Pose estimation of construction materials using multiple id devices for construction automation	2006	$Tc_{232}A_{51}$	$s_{87}$	$cc_{109}$	-
57	Sustainable cooperative robotic technologies for human and robotic outpost infrastructure construction and maintenance	2006	$Tc_{55}A_{19}$	$s_{38}$	$cc_{114}$	-
58	A distributed feedback mechanism to regulate wall construction by a robotic swarm	2006	$Tc_{22}A_{11}$	$s_{24}$	$cc_{27}$	-
59	Wireless sensor-driven intelligent navigation robots for indoor construction site security and safety	2006	$Tc_{105}A_{32}$	$s_{142}$	$cc_{31}$	-



60	Control architecture characteristics for intelligence in autonomous mobile construction robots	2006	$Tc_{154}A_{50}$	-	$cc_{46}$	-
61	Closure to "construction robot path-planning for earthwork operations" by Sung-Keun Kim, Jeffrey S. Russell, and Kyo-Jin Koo	2006	$Tc_{145}A_5$	$s_{87}$	$cc_{65}$	-
62	A 3D model based control of an excavator	2006	$Tc_2A_1$	$s_{68}$	$cc_{68}$	-
63	Autonomous robot for pavement construction in challenging environments	2006	$Tc_1A_1$	$s_{69}$	$cc_{69}$	-
64	Research on RBF-PID control for the 6-DOF motion base in construction tele-robot system	2006	$Tc_{197}A_{50}$	$s_{81}$	$cc_{79}$	-
65	Development of a real-time control system architecture for automated steel construction	2006	$Tc_{27}A_8$	$s_{39}$	$cc_{90}$	-
66	Development of a remote control system for construction machinery for rescue activities with a pneumatic robot	2006	$Th_{84}A_{41}$	$a_1$	$b_{30}$	$ch_1$
67	Experiment on teleoperation of underwater backhoe with haptic information	2006	$Th_{118}A_{55}$	$a_2$	$b_3$	$ch_1$
68	A novel distributed telerobotic system for construction machines based on modules synchronization	2006	$Th_{94}A_{56}$	$a_2$	-	$ch_1$
69	Automation of incineration plant demolition and utilization of information technology	2006	$Th_{18}A_{11}$	$a_3$	$b_{32}$	$ch_1$
70	Examination of practical utility of remotely controlled robots in disasters	2006	$Th_{86}A_{42}$	-	$b_3$	$ch_1$
71	Using rescue robots to increase construction site safety	2006	$Th_{53}A_{23}$	$a_3$	$b_{66}$	$ch_2$
72	Massive rock handling by a breaker - Graspless manipulation and object recognition	2006	$Th_{51}A_{59}$	-	$b_{30}$	$ch_2$
73	Construction automation based on parts and packets unification	2006	$Th_{25}A_{34}$	-	$b_{67}$	$ch_2$
74	A multidegree-of-freedom manipulator for curtain-wall installation	2006	$Th_8A_{11}$	$a_3$	$b_2$	$ch_3$
75	The application of the human-robot cooperative system for construction robot manipulating and installing heavy materials	2006	$Th_{89}A_{44}$	-	-	$ch_3$
76	The study in using an autonomous robot for pavement inspection	2007	$Tc_{215}A_6$	$s_{39}$	$cc_{103}$	-
77	Graphical modeling and simulation for design and control of a tele-operated clinker clearing robot	2007	$Tc_{93}A_{56}$	$s_{39}$	$cc_{36}$	-
78	A multicriteria approach for the optimal design of 2 DOF parallel robots used in construction applications	2007	$Tc_{33}A_{50}$	-	$cc_{49}$	-

79	Modified stereo vision calibration method for construction robot	2007	$Tc_{76}A_{52}$	-	$cc_{73}$	-
80	Development of immersive Augmented Reality Interface for Construction Robotic System	2007	$Tc_{199}A_{56}$	$s_{39}$	$cc_{80}$	-
81	Pre-acting manipulator for shock isolation in steel construction	2007	$Tc_{229}A_8$	-	$cc_{91}$	-
82	Intelligent painting process planner for robotic bridge painting	2007	$Te_6A_{12}$	-	$ce_6$	-
83	Control schemes for tele-robotic pipe installation	2007	$Th_{38}A_{21}$	$a_2$	$b_{69}$	$ch_1$
84	Intuitive OCU (Operator Control Unit) of MFR (Multipurpose Field Robot) on construction site	2007	$Th_{93}A_{44}$	-	$b_2$	$ch_1$
85	Concrete paving productivity improvement using a multi-task autonomous robot	2007	$Th_1A_1$	$a_2$	$b_{32}$	$ch_2$
86	A UAV for bridge inspection: Visual servoing control law with orientation limits	2007	$Th_{80}A_6$	$a_3$	$b_{58}$	$ch_2$
87	Cable-suspended robotic contour crafting system	2007	$Th_{16}A_{63}$	$a_6$	$b_{25}$	$ch_2$
88	Design of a bolting robot for constructing steel structure	2007	$Th_{146}A_8$	-	$b_{26}$	$ch_2$
89	Cable-suspended robotic contour crafting system (vol 17, pg 45, 2007)	2007	$Th_{25}A_{63}$	-	$b_{67}$	$ch_2$
90	Design of a ceiling glass installation robot	2007	$Th_{56}A_{28}$	$a_3$	$b_{42}$	$ch_3$
91	Auto inspection system using a mobile robot for detecting concrete cracks in a tunnel	2007	$Th_{63}A_6$	$a_3$	$b_{32}$	$ch_3$
92	Development of the curtain wall installation robot: Performance and efficiency tests at a construction site	2007	$Th_8A_{11}$	$a_3$	$b_2$	$ch_3$
93	MFR (Multipurpose Field Robot) for installing construction materials	2007	$Th_8A_{44}$	$a_3$	$b_2$	$ch_3$
94	Robotic technologies for the automatic assemble of massive beams in high-rise building	2007	$Th_{70}A_{34}$	-	$b_{60}$	$ch_3$
95	Human-robot cooperation control for installing heavy construction materials	2007	$Th_{90}A_{44}$	-	$b_{67}$	$ch_3$
96	Construction of welding robot network control system	2008	$Tc_{168}A_{54}$	-	$cc_{16}$	-
97	Development of prototype of a unmanned transport robot for transport of construction materials	2008	$Tc_{89}A_{29}$	$s_{114}$	$cc_{36}$	-
98	Anti-swinging input shaping control of an automatic construction crane	2008	$Tc_{119}A_{34}$	$s_{39}$	$cc_{79}$	-
99	Improved force feedback control method for construction telerobot	2008	$Tc_{198}A_{56}$	$s_6$	$cc_{79}$	-
100	Construction telerobot system with virtual reality (development of a bilateral construction robot)	2008	$Tc_{86}A_{56}$	-	$cc_{86}$	-

101	Development of an automated verticality alignment system for a vibro-lance	2008	$Tc_{149}A_{50}$	$s_{89}$	$cc_{90}$	-
102	Task management of robots for the automatic construction	2008	$Te_9A_{29}$		$ce_9$	-
103	Remote control of backhoe at construction site with a pneumatic robot system	2008	$Th_{122}A_{56}$	$a_1$	$b_{12}$	$ch_1$
104	Power assist devices for installing plaster panels in construction	2008	$Th_{95}A_{44}$	$a_3$	$b_{32}$	$ch_1$
105	A robotic system for road lane painting	2008	$Th_2A_1$	$a_3$	$b_{52}$	$ch_2$
106	A new type of bolting robot for steel-frame structure constructions	2008	$Th_{13}A_8$	$a_3$	$b_7$	$ch_2$
107	A comparison of two innovative technologies for safe pipe installation - "Pipeman" and the Stewart-Gough platform-based pipe manipulator	2008	$Th_{37}A_{21}$	$a_2$	$b_{25}$	$ch_3$
108	Human robot cooperative control and task planning for a glass ceiling installation robot	2008	$Th_{57}A_{28}$	$a_3$	$b_{44}$	$ch_3$
109	Autonomous drilling robot for landslide monitoring and consolidation	2008	$Th_{139}A_{60}$	$a_3$	$b_{12}$	$ch_3$
110	Wearable haptic glove using micro hydraulic system for control of construction robot system with VR environment	2008	$Th_{71}A_{34}$	-	$b_{45}$	$ch_3$
111	A human-robot cooperative system helps out with glass panels in construction	2008	$Th_{89}A_{10}$	-	-	$ch_3$
112	Development of automation system for steel construction based on robotic crane	2008	$Th_{144}A_8$	$a_2$	$b_{63}$	$ch_6$

● Samples in StageIII(duration: 2009-2015; Sample number 139)

No.	Seminal paper (title)	Publication Year	Labels	Label compositions		
1	Feasibility verification of brick-laying robot using manipulation trajectory and the laying pattern optimization	2009	$T_{c71}A_{22}$	$s_{18}$	$cc_{105}$	-
2	A laser-technology-based lifting-path tracking system for a robotic tower crane	2009	$T_{c91}A_{29}$	$s_{113}$	$cc_{111}$	-
3	Haptic interaction in tele-operation control system of construction robot based on virtual reality	2009	$T_{c192}A_{56}$	$s_{134}$	$cc_{113}$	-
4	Light-weight 3D LADAR system for construction robotic operations	2009	$T_{c104}A_{32}$	$s_{14}$	$cc_{25}$	-
5	Simulation of industrial robots for laser welding of load bearing construction	2009	$T_{c167}A_{54}$	$s_{14}$	$cc_{32}$	-
6	Tele-operation construction robot control system with virtual reality	2009	$T_{c186}A_{56}$	$s_{133}$	$cc_{36}$	-
7	Work state identification using primitive static states - Implementation to demolition work in double-front work machines	2009	$T_{c128}A_{41}$	$s_{81}$	$cc_{59}$	-
8	Bridge inspection robot system with machine vision	2009	$T_{c209}A_6$	$s_{104}$	$cc_{73}$	-
9	Position error modeling for automated construction manipulators	2009	$Te_{10}A_{14}$	-	$cc_{10}$	-
10	Development of conceptual model of construction factory for automated construction	2009	$Te_{12}A_{35}$	-	$cc_{12}$	-
11	A performance evaluation of a Stewart platform based Hume concrete pipe manipulator	2009	$Te_7A_{21}$	-	$cc_7$	-
12	Chronological development history of X-Y table based pavement crack sealers and research findings for practical use in the field	2009	$Th_3A_1$	$a_1$	$b_2$	$ch_2$
13	Design, Construction, and testing of a new class of mobile robots for cave exploration	2009	$Th_{129}A_6$	$a_3$	$b_{74}$	$ch_2$
14	Experimental evaluation of a robotic bolting device in steel beam assembly	2009	$Th_{13}A_8$	$a_3$	$b_7$	$ch_2$
15	Basic study of smart robotic construction lift for increasing resource lifting efficiency in high-rise building construction	2009	$Th_{26}A_{29}$	-	$b_{49}$	$ch_2$
16	Robotic automation system for steel beam assembly in building construction	2009	$Th_{145}A_8$	$a_3$	$b_{63}$	$ch_3$
17	Virtual reality-based teleoperation construction robot control system with 3D visor device	2010	$T_{c190}A_{56}$	$s_{135}$	$cc_{26}$	-
18	Specific mechanisms for construction mobile robots	2010	$T_{c160}A_{50}$		$cc_{45}$	-
19	Labview based control and simulation of a construction robot	2010	$T_{c162}A_{50}$	$s_{57}$	$cc_{79}$	-
20	Research on improved force feedback control method for construction telerobot	2010	$T_{c198}A_{56}$	$s_6$	$cc_{79}$	-

21	Development of immersive augmented reality interface system for construction robotic system	2010	$Tc_{199}A_{56}$	$s_{39}$	$cc_{80}$	-
22	Bilateral hydraulic servo control system based on force sense for construction robot	2010	$Tc_{196}A_{50}$	$s_6$	$cc_{84}$	-
23	Research on bilateral hydraulic servo control system of construction robotics	2010	$Tc_{201}A_{50}$	$s_6$	$cc_{86}$	-
24	Study on master-slave control method using load force and impedance identifiers for Tele-operated hydraulic construction robot	2010	$Tc_{86}A_{56}$	-	$cc_{86}$	-
25	Climbing and pole line hardware installation robot for construction of distribution lines	2010	$Th_{92}A_{44}$	$a_2$	$b_{24}$	$ch_2$
26	Self-traveling robotic system for autonomous abrasive blast cleaning in double-hulled structures of ships	2010	$Th_{50}A_{45}$	$a_3$	$b_{36}$	$ch_2$
27	Implementation of a foldable 3-DOF master device to a glass window panel fitting task	2010	$Th_{66}A_{10}$	$a_3$	$b_{25}$	$ch_2$
28	Mechanism and analysis of a robotic bolting device for steel beam assembly	2010	$Th_{14}A_8$		$b_7$	$ch_2$
29	Development of a dual robotic arm system to evaluate intelligent system for advanced construction machinery	2010	$Th_{54}A_{26}$	$a_2$	$b_{61}$	$ch_3$
30	An improved multipurpose field robot for installing construction materials	2010	$Th_8A_{44}$	$a_3$	$b_2$	$ch_3$
31	Robot-aided tunnel inspection and maintenance system	2011	$Tc_{214}A_6$	-	$cc_{104}$	-
32	Strateg+D171 Autonomous robots to inspect pavement distresses	2011	$Tc_{211}A_6$	$s_{109}$	$cc_{107}$	-
33	A conceptualization for the automation of a lift car operation in high rise building construction	2011	$Tc_{49}A_{17}$	$s_{157}$	$cc_{112}$	-
34	LTL-based decentralized supervisory control of multi-robot tasks modelled as Petri nets	2011	$Tc_{164}A_{50}$		$cc_{114}$	-
35	Concept of a wall building industrial robotic system	2011	$Tc_{20}A_{11}$		$cc_{28}$	-
36	Development of pressure observer to measure cylinder length of harbor-construction robot	2011	$Tc_{24}A_{40}$	$s_8$	$cc_{38}$	-
37	Study on a vision sensing system for the parameter estimation of a serial construction robot	2011	$Tc_{155}A_{52}$	$s_{108}$	$cc_{62}$	-
38	A plan for lunar outpost construction by using robots	2011	$Tc_{94}A_{30}$	$s_{109}$	$cc_{62}$	-
39	Relative accuracy enhancement system based on internal error range estimation for external force measurement in construction manipulator	2011	$Te_{10}A_{52}$	-	$ce_{10}$	-
40	Dimension optimization of an orientation fine-tuning manipulator for segment assembly robots in shield tunneling machines	2011	$Te_4A_9$	-	$ce_4$	-
41	A methodology to quantitatively evaluate the safety of a glazing robot	2011	$Te_5A_{10}$	-	$ce_5$	-
42	Tele-operation construction robot control system with virtual reality technology	2011	$Th_{119}A_{56}$	$a_2$		$ch_1$
43	Wearable robotic system using hydraulic actuator	2011	$Th_{68}A_{33}$	$a_2$	$b_{45}$	$ch_2$

44	Field application of a robotic system on cable stays of incheon bridge for snow removal	2011	$Th_{20}A_{12}$	$a_3$	$b_{57}$	$ch_2$
45	Development of building-façade maintenance robot with docking station based on vertical climbing mechanism (maintenance)	2011	$Th_{10}A_{19}$	$a_3$	$b_{16}$	$ch_2$
46	Robot system for removing asbestos sprayed on beams	2011	$Th_4A_{20}$	$a_3$	$b_2$	$ch_2$
47	An experimental study of automatic cleaning tool and robot for façade in high-rise buildings	2011	$Th_{97}A_{45}$	$a_5$	$b_{26}$	$ch_2$
48	Real-time NDE of steel cable using elasto-magnetic sensors installed in a cable climbing robot	2011	$Th_{148}A_8$	$a_6$	$b_{24}$	$ch_2$
49	Development of robotic-crane based automatic construction system for steel structures of high-rise buildings	2011	$Th_{26}A_{17}$	-	$b_{49}$	$ch_2$
50	Building of a sample scenario of a built-in guide type robot for external wall maintenance work of a skyscraper	2011	$Th_{28}A_{17}$	-	-	$ch_2$
51	Window contamination detection method for the robotic building maintenance system	2011	$Th_{28}A_{19}$	-	-	$ch_2$
52	Development of high accuracy position making system applying mark robot in construction site	2011	$Th_{28}A_{38}$	-	-	$ch_2$
53	Robot-aided tunnel inspection and maintenance system by vision and proximity sensor integration	2011	$Th_{153}A_6$	$a_3$	$b_2$	-
54	Development of double arm working machine for demolition and scrap processing	2011	$Th_{82}A_{41}$	$a_2$	$b_{61}$	$ch_6$
55	Tunnel boring machine positioning automation in tunnel construction	2012	$Tc_{25}A_9$	$s_{39}$	$cc_{115}$	-
56	High accuracy position marking system applying mobile robot in construction site	2012	$Tc_{13}A_{38}$		$cc_{115}$	-
57	Automatic welding robot system for the horizontal position in the shipyard	2012	$Tc_{13}A_{54}$		$cc_{115}$	-
58	Development of high accuracy position marking system in construction site applying automated mark robot	2012	$Tc_{125}A_{38}$	-	$cc_{119}$	-
59	Model analysis and experimental technique on computing accuracy of seam spatial position information based on stereo vision for welding robot	2012	$Tc_{165}A_{54}$	$s_{16}$	$cc_{19}$	-
60	Autonomous task control system of construction tele-robot based on stereo vision	2012	$Tc_{189}A_{56}$		$cc_{26}$	-
61	Autonomous Construction of a Roofed Structure: Synthesizing Planning and Stigmergy on a Mobile Robot	2012	$Tc_{10}A_{11}$	$s_{25}$	$cc_{29}$	-
62	Development of refractory brick construction robot in steel works	2012	$Tc_{68}A_{22}$	$s_{72}$	$cc_3$	-
63	Research on ROI image processing technology of teleoperation construction robot based on trinocular stereo vision	2012	$Tc_{184}A_{56}$	-	$cc_{62}$	-

64	Sensor Based Motion Planning and Estimation of High-rise Building Facade Maintenance Robot	2012	$T_{c48}A_{17}$	$s_{119}$	$cc_{67}$	-
65	Study on 3-D laser-scanning-based machine vision system for robotic construction vehicles	2012	$T_{c100}A_{32}$	$s_{14}$	$cc_{73}$	-
66	Force feedback control of tele-operated construction robot based on regression model	2012	$T_{c191}A_{56}$	-	$cc_{84}$	-
67	Application of a position-force control method in a master-slave teleoperation construction robot system	2012	$T_{c86}A_{25}$	-	$cc_{86}$	-
68	Operability of a control method for grasping soft objects in a construction teleoperation robot tested in virtual reality	2012	$T_{c86}A_{25}$	-	$cc_{86}$	-
69	Master-slave control method with force feedback for grasping soft objects using a teleoperation construction robot	2012	$T_{c86}A_{25}$	-	$cc_{86}$	-
70	Human-robot-environment interaction interface for robotic grit-blasting of complex steel bridges	2012	$T_{c35}A_{12}$	$s_{14}$	$cc_{90}$	-
71	Evaluation of construction robot telegrasping force perception using visual, auditory and force feedback integration	2012	$T_{e11}A_{56}$	-	$cc_{11}$	-
72	A robotic system for underwater eco-sustainable wire-cutting	2012	$Th_{115}A_{55}$	$a_3$	$b_4$	$ch_2$
73	Autonomous construction of a roofed structure: Synthesizing planning and stigmergy on a mobile robot	2012	$Th_{27}A_{28}$	$a_3$	$b_{46}$	$ch_2$
74	Hete+A184:H184rogeous multi-configurable chained microrobot for the exploration of small cavities	2012	$Th_{129}A_6$	$a_3$	$b_{74}$	$ch_2$
75	Design and construction of an in-pipe robot for inspection and maintenance	2012	$Th_{22}A_6$	$a_3$	$b_{32}$	$ch_2$
76	High Accuracy Position Marking System Applying Mobile Robot in Construction Site	2012	$Th_{28}A_{38}$	-	-	$ch_2$
77	Open robot control for services in construction	2012	$Th_{63}A_3$	$a_3$	$b_{32}$	$ch_3$
78	An easy handling system for installing heavy glass using human robot cooperation	2012	$Th_{64}A_{10}$	-	$b_{30}$	$ch_3$
79	Autonomous robotic dozing for rapid material removal	2013	$T_{c84}A_{29}$	-	$cc_{10}$	-
80	Human-robot integration for pose estimation and semi-autonomous navigation on unstructured construction sites	2013	$T_{c109}A_{32}$	-	$cc_{112}$	-
81	A novel surface segmentation approach for robotic manipulator-based maintenance operation planning	2013	$T_{c53}A_{19}$	$s_{54}$	$cc_{116}$	-
82	Development of fail-safety system for building wall cleaning robot	2013	$T_{c18}A_{11}$	$s_{26}$	$cc_{30}$	-
83	Mutli-robot distributed control for construction tasks based on intelligent beacons	2013	$T_{c157}A_{50}$	-	$cc_{37}$	-
84	Autonomous thin spray-on liner application in irregular tunnel and mine roadway surfaces	2013	$T_{c62}A_{20}$	$s_{37}$	$cc_{40}$	-

85	Path planning of wheel loader type robot for scooping and loading operation by genetic algorithm	2013	$T_{c33}A_{24}$		$cc_{49}$	-
86	Potentials of robotic fabrication in wood construction: Elastically bent timber sheets with robotically fabricated finger joints	2013	$T_{c87}A_{37}$	$s_8$	$cc_5$	-
87	Design and research of a construction robot based on series parallel structure	2013	$T_{c96}A_{31}$		$cc_{54}$	-
88	Geometric and kinematics modeling of tele-operated virtual construction robot	2013	$T_{c27}A_{56}$		$cc_{90}$	-
89	An implementation of a teleoperation system for robotic beam assembly in construction	2013	$T_{c114}A_{34}$	$s_{54}$	$cc_{95}$	-
90	Analysis on autonomous task trajectory tracking performance of construction robot with online gravity compensation	2013	$Te_{10}A_{35}$	-	$cc_{10}$	-
91	Job planning and supervisory control for automated earthmoving using 3D graphical tools	2013	$Th_{107}A_5$	-	-	$ch_1$
92	Development of an automated freeform construction system and its construction materials	2013	$Th_{13}A_{29}$	$a_3$	$b_7$	$ch_2$
93	Optimal machine operation planning for construction by Contour Crafting	2013	$Th_{140}A_{63}$	$a_6$	$b_{57}$	$ch_2$
94	Design and construction of a scale robotic excavator work-cell to test automated excavation algorithms	2013	$Th_{51}A_7$	-	$b_{30}$	$ch_2$
95	Robot-based construction automation: An application to steel beam assembly (Part I)	2013	$Th_{147}A_8$	$a_2$	$b_7$	$ch_3$
96	Prototype for glazed panel construction robot	2013	$Th_{149}A_{10}$	$a_3$	$b_{62}$	$ch_3$
97	Robot-based construction automation: An application to steel beam assembly (Part II)	2013	$Th_8A_8$	$a_3$	$b_2$	$ch_3$
98	Glazed ceiling panel construction robot	2013	$Th_{58}A_{28}$	-	$b_{44}$	$ch_3$
99	Installation of heavy duty glass using an intuitive manipulation device	2013	$Th_{64}A_{10}$	-	$b_{30}$	$ch_3$
100	Potential of Time-of-Flight Range Imaging for Object Identification and Manipulation in Construction	2014	$T_{c34}A_{29}$	$s_{39}$	$cc_{112}$	-
101	Chip-based real-time gesture tracking for construction robot's guidance	2014	$T_{c156}A_{50}$	$s_{39}$	$cc_{26}$	-
102	Modified discrete event simulation algorithm for control of automated construction operations	2014	$T_{c160}A_{50}$	-	$cc_{45}$	-
103	Automating construction operations using discrete event simulation models	2014	$T_{c160}A_{50}$	-	$cc_{45}$	-
104	(tiling) Robotic tile placement: Tools, techniques and feasibility	2014	$T_{c58}A_2$	$s_{64}$	$cc_{60}$	-
105	Development of a teleoperation system for a construction robot	2014	$T_{c185}A_{56}$	$s_{136}$	$cc_{62}$	-
106	Automatic detection and verification of pipeline construction features with multi-modal data	2014	$T_{c66}A_{21}$	$S_{39}$	$cc_{62}$	-



107	Development of a BIM-based automated construction system	2014	$Tc_{21}A_{34}$	-	$cc_{75}$	-
108	Virtual prototyping for robotic fabrication of rebar cages in manufactured concrete construction	2014	$Tc_{228}A_8$	$s_{92}$	$cc_{92}$	-
109	Rapid and automated determination of rusted surface areas of a steel bridge for robotic maintenance systems	2014	$Tc_{30}A_{12}$	$s_{39}$	$cc_{98}$	-
110	A Tree-Based Algorithm for Construction Robots	2014	$Tc_{113}A_{34}$		$cc_{98}$	-
111	Underwater construction robot for rubble leveling on the seabed for port construction	2014	$Th_{137}A_{55}$	$a_2$	$b_2$	$ch_1$
112	Considerations regarding the construction of a minirobot for surveillance and inspection	2014	$Th_{131}A_6$	$a_3$	$b_{71}$	$ch_2$
113	Towards a vision controlled robotic home environment	2014	$Th_{121}A_{57}$	$a_3$	$b_{83}$	$ch_2$
114	Mobile 3D mapping for surveying earthwork projects using an Unmanned Aerial Vehicle (UAV) system	2014	$Th_{47}A_5$	$a_3$	$b_{58}$	$ch_2$
115	A lightweight bridge inspection system using a dual-cable suspension mechanism	2014	$Th_4A_6$	$a_3$	$b_2$	$ch_2$
116	Towards On-Site Autonomous Robotic Floor Tiling of Mosaics	2014	$Th_{31}A_2$	-	$b_1$	$ch_2$
117	Introduction of human-robot cooperation technology at construction sites	2014	$Th_{26}A_{10}$	-	$b_{49}$	$ch_2$
118	Collision-free 4D trajectory planning in Unmanned Aerial Vehicles for assembly and structure construction	2014	$Th_{46}A_{34}$	-	$b_{58}$	$ch_2$
119	Robotic explosive charging in mining and construction applications	2014	$Th_{105}A_{47}$	$a_2$	$b_2$	$ch_3$
120	In-Situ fabrication: Mobile robotic units on construction sites	2014	$Th_{72}A_{34}$	-	$b_{42}$	$ch_3$
121	Modeling and control of automated pipe hoisting in oil and gas well construction	2015	$Tc_{67}A_{21}$	-	$cc_{101}$	-
122	Construction site navigation for the autonomous excavator Thor	2015	$Tc_{111}A_{32}$	$s_{143}$	$cc_{105}$	-
123	Position reaction force control of teleoperation construction robot for grasping soft objects	2015	$Tc_{40}A_{14}$	$s_{127}$	$cc_{113}$	-
124	Automated measurement and estimation of concrete strength by mobile robot with small-sized grinding drill	2015	$Tc_{158}A_{52}$	$s_6$	$cc_{113}$	-
125	Vision guided autonomous robotic assembly and as-built scanning on unstructured construction sites	2015	$Tc_{108}A_{34}$	$s_{54}$	$cc_{118}$	-
126	Intuitive task programming of stud welding robots for ship construction	2015	$Tc_{135}A_{54}$	$s_{39}$	$cc_{20}$	-

127	Automatic path-planning algorithm for realistic decorative robotic painting	2015	$Tc_{61}A_{20}$	$s_{39}$	$cc_{41}$	-
128	Design and construction of a translational parallel robot for drilling tasks	2015	$Tc_{85}A_{25}$	-	$cc_{50}$	-
129	Towards a new BIM 'dimension'-translating BIM data into actual construction using robotics	2015	$Tc_{21}A_{22}$	-	$c_{675}$	-
130	Augmented reality-based tele-robotic system architecture for on-site construction	2015	$Tc_{199}A_{56}$	$s_{39}$	$cc_{80}$	-
131	Development of a telerobotics system for construction robot using virtual reality	2015	$Tc_{202}A_{56}$	$s_{136}$	$cc_{86}$	-
132	A framework of indicators for assessing construction automation and robotics in the sustainability context	2015	$Te_{12}A_{35}$	-	$ce_{12}$	-
133	A robotic cutting tool for contaminated structure maintenance and decommissioning	2015	$Th_{30}A_{19}$	$a_2$	$b_{57}$	$ch_2$
134	Design and construction of a robot hand prototype for underwater applications	2015	$Th_{116}A_{55}$	$a_3$	$b_5$	$ch_2$
135	Assistive robotic micro-rooms for independent living	2015	$Th_{121}A_{57}$	$a_3$	$b_{83}$	$ch_2$
136	A low-cost robotic system for the efficient visual inspection of tunnels	2015	$Th_2A_6$	$a_3$	$b_{52}$	$ch_2$
137	Cable robot for non-standard architecture and construction: A dynamic positioning system	2015	$Th_{52}A_{29}$	$a_6$	$b_{13}$	$ch_2$
138	Between Manual and Robotic Approaches to Brick Construction in Architecture Expanding the Craft of Manual Bricklaying with the Help of Video Projection Techniques	2015	$Th_{43}A_{22}$	-	$b_{54}$	$ch_2$
139	Ceiling work scenario based hardware design and control algorithm of supernumerary robotic limbs	2015	$Th_{29}A_{28}$	$a_3$	$b_{45}$	$ch_3$

● Samples in StageIV(duration: 2016-2021; Sample number 229)

No.	Seminal paper (title)	Publication Year	Labels	Label compositions		
1	Robotic SHM and Model-Based Positioning System for Monitoring and Construction Automation	2016	$Tc_{136}A_{14}$	$s_{126}$	$cc_{108}$	-
2	Estimation for torques applied to the master side in a construction robot teleoperation system	2016	$Tc_{177}A_{56}$	$s_6$	$cc_{20}$	-
3	Research on Improving the Efficiency and Welding Quality of Welding Robot for Construction Machinery Structure	2016	$Tc_{122}A_{54}$	-	$cc_{21}$	-
4	Parameter study of chain trenching machines of Underwater Construction Robots via analytical model	2016	$Tc_{180}A_{55}$	-	$cc_3$	-
5	Robotic 3D-printing for building and construction	2016	$Tc_{45}A_{18}$	$s_{39}$	$cc_{44}$	-
6	Machine Learning approach to Automatic Bucket Loading	2016	$Tc_{148}A_{29}$	$s_{85}$	$cc_{73}$	-
7	Site Automation: Automated/Robotic On-Site Factories	2016	$Tc_{76}A_{34}$	-	$cc_{73}$	-
8	Simulation of automated construction using wire robots	2016	$Tc_{21}A_{22}$	-	$cc_{75}$	-
9	Support system for slope shaping based on a teleoperated construction robot	2016	$Tc_{195}A_{56}$	-	$cc_{78}$	-
10	Support system for teleoperation of slope shaping by a construction robot	2016	$Tc_{203}A_{56}$	$s_{39}$	$cc_{86}$	-
11	A realisation of a construction scale robotic system for 3D printing of complex formwork	2016	$Tc_{218}A_{61}$	-	$cc_9$	-
12	Smart automation system dedicated to in frastructure and construction	2016	$Tc_{28}A_{12}$	$s_{96}$	$cc_{99}$	-
13	Bridge maintenance automation	2016	$Te_6A_{12}$	-	$ce_6$	-
14	Key challenges in automation of earth-moving machines	2016	$Th_{108}A_5$	$a_2$	$b_{32}$	$ch_1$
15	Design and analysis of climbing robot based on construction surface inspection	2016	$Th_{136}A_6$	$a_3$	$b_{19}$	$ch_1$
16	Prototyping a remotely-controlled machine for concrete surface grinding operations	2016	$Th_{120}A_{56}$	$a_3$	$b_{32}$	$ch_1$
17	An electro-hydraulic servo controller for construction robot using system-on-chip device	2016	$Th_{110}A_{50}$	$a_4$	$b_{52}$	$ch_1$
18	Automated construction of masonry buildings using cable- driven parallel robots	2016	$Th_{44}A_{22}$	$a_6$	$b_{26}$	$ch_2$

19	Study on parts processing of the traditional wooden construction method using articulated robot	2016	$Th_{109}A_{37}$	-	$b_{78}$	$ch_2$
20	Local search on trees and a framework for automated construction using multiple identical robots	2016	$Th_{109}A_{50}$	-	$b_{78}$	$ch_2$
21	Robotic timber construction - Expanding additive fabrication to new dimensions	2016	$Th_{14}A_{37}$	-	$b_7$	$ch_2$
22	Autonomous construction with compliant building material	2016	$Th_{23}A_{29}$	-	$b_{32}$	$ch_2$
23	Automation of modular assembly of structural frames for buildings	2016	$Th_{74}A_{34}$	$a_3$	$b_9$	$ch_3$
24	Applications of supernumerary robotic limbs to construction works: Case studies	2016	$Th_{29}A_{29}$	$a_3$	$b_{45}$	$ch_3$
25	Human-Machine Interaction for Intuitive Programming of Assembly Tasks in Construction	2016	$Th_{73}A_{34}$	-	$b_{30}$	$ch_3$
26	A cable-driven robot for architectural constructions: a visual-guided approach for motion control and path-planning	2017	$Tc_{83}A_{24}$	$s_{39}$	$cc_{105}$	-
27	Automatic interpretation of unordered point cloud data for UAV navigation in	2017	$Tc_{110}A_{32}$	$s_{14}$	$cc_{110}$	-
28	Using local force measurements to guide construction by distributed climbing robots	2017	$Tc_{234}A_{52}$	$s_6$	$cc_{114}$	-
29	Robotic system for plaster and finishing works on the construction site	2017	$Tc_{16}A_{58}$	-	$cc_{32}$	-
30	Development of a remotely controlled semi-underwater heavy carrier robot for unmanned construction works	2017	$Tc_{238}A_{55}$	-	$cc_4$	-
31	SMCSPO based 3D printing simulator control for building construction	2017	$Tc_{44}A_{16}$	-	$cc_{44}$	-
32	Development of 3D printing simulator nozzle system using PID control for building construction	2017	$Tc_{44}A_{16}$	-	$cc_{44}$	-
33	Automation of robotic concrete printing using feedback control system	2017	$Tc_{44}A_{16}$	-	$cc_{44}$	-
34	Classification of building systems for concrete 3D printing	2017	$Tc_{44}A_{16}$	-	$cc_{44}$	-
35	Active control for rock grinding works of an underwater construction robot consisting of hydraulic rotary and linear actuators	2017	$Tc_{87}A_{55}$	$s_8$	$cc_5$	-
36	A method based on C-K Theory for fast STCR development: The case of a drilling robot design	2017	$Tc_{217}A_{60}$	-	$cc_{57}$	-
37	Development of the control algorithm for longitudinal motion of Underwater Construction Robot with trenching	2017	$Tc_{176}A_{55}$	$s_6$	$cc_6$	-

38	A Stochastic Learning Approach for Construction of Brick Structures with a Ground Robot	2017	$T_{c77}A_{22}$	-	$cc_{72}$	-
39	Online Learning Control of Hydraulic Excavators Based on Echo-State Networks	2017	$T_{c223}A_{50}$	$s_{43}$	$cc_{73}$	-
40	Beam for the steel fabrication industry robotic systems	2017	$T_{c73}A_8$	$s_{14}$	$cc_{75}$	-
41	Model-based development of robotic systems and services in construction robotics	2017	$T_{c21}A_3$		$cc_{75}$	-
42	Scene understanding for adaptive manipulation in robotized construction work	2017	$T_{c120}A_{34}$	$s_{127}$	$cc_{82}$	-
43	A master-slave control method with gravity compensation for a hydraulic teleoperation construction robot	2017	$T_{c204}A_{56}$	$s_{137}$	$cc_{86}$	-
44	Robotic fabrication of freeform foam structures with quadrilateral and puzzle shaped panels	2017	$T_{c27}A_{34}$	-	$cc_{90}$	-
45	PyroShield - A HVAC fire curtain testing robot	2017	$T_{c221}A_{62}$	$s_{39}$	$cc_{94}$	-
46	Target-Focused Local Workspace Modeling for Construction Automation Applications	2017	$T_{c98}A_{32}$	$s_{82}$	$cc_{96}$	-
47	Potential benefits of digital fabrication for complex structures: Environmental assessment of a robotically fabricated concrete-wall	2017	$Te_1A_{11}$	-	$ce_1$	-
48	Development of a wall-climbing platform with modularized wall-cleaning units	2017	$Th_{104}A_{45}$	$a_3$	$b_{35}$	$ch_1$
49	Autonomous robotic system with tunnel inspection tool positioning	2017	$Th_{138}A_6$	$a_3$	$b_2$	$ch_1$
50	Three types of robot builder for the unsupervised construction of Mars habitats	2017	$Th_{65}A_{30}$	$a_1$	$b_{70}$	$ch_2$
51	Robotic mechanical design for brick-laying automation	2017	$Th_{45}A_{22}$	$a_3$	$b_{59}$	$ch_2$
52	Wall contact by octo-rotor UAV with one DoF manipulator for bridge inspection	2017	$Th_{47}A_6$	$a_3$	$b_{58}$	$ch_2$
53	Development of a novel post-construction quality assessment robot system	2017	$Th_{22}A_{15}$	$a_3$	$b_{32}$	$ch_2$
54	Design and construction of an inspection robot for the sewage pipes	2017	$Th_{22}A_6$	$a_3$	$b_{32}$	$ch_2$
55	Autonomous big-scale additive manufacturing using cable-driven robots	2017	$Th_{16}A_{11}$	$a_6$	$b_{25}$	$ch_2$
56	JA-WA - A wall construction system using unilateral material application with a mobile robot	2017	$Th_{15}A_{11}$	-	$b_{23}$	$ch_2$
57	Industrial robots application in the construction of buildings and structures	2017	$Th_{67}A_{60}$	-	$b_{75}$	$ch_2$
58	Towards force-aware robot collectives for on-site construction	2017	$Th_{111}A_{52}$	-	$b_{16}$	$ch_2$
59	Construction inspection with unmanned aerial vehicle [Bauwerksinspektion mit unbemannten Flugsystemen]	2017	$Th_{46}A_6$	-	$b_{58}$	$ch_2$

60	A Novel Building Post-Construction Quality Assessment Robot: Design and Prototyping	2017	$Th_{23}A_{15}$	-	$b_{32}$	$ch_2$
61	Construction Techniques Used to Automatically Pass Standard Box Girders through Special Passenger-Line Tunnels	2017	$Th_{77}A_9$	-	$b_2$	$ch_2$
62	Bottom-up cognitive analysis of bionic inspection robot for construction site	2017	$Th_{28}A_6$	-	-	$ch_2$
63	Design of Modular Re-configurable Robotic System for Construction and Digital Fabrication	2017	$Th_{75}A_{34}$	$a_5$	$b_7$	$ch_3$
64	On-Site Robotic Construction Assistance for Assembly Using A-Priori Knowledge and Human-Robot Collaboration	2017	$Th_{64}A_3$	-	$b_{30}$	$ch_3$
65	Automated localization of UAVs in GPS-denied indoor construction environments using fiducial markers	2018	$Tc_{99}A_{32}$	$s_{109}$	$cc_{103}$	-
66	Construction equipment collision-free path planning using robotic approach	2018	$Tc_{84}A_{24}$	-	$cc_{103}$	-
67	A robotic wearable exoskeleton for construction worker's safety and health	2018	$Tc_{84}A_{33}$	-	$cc_{103}$	-
68	Identification of usage scenarios for robotic exoskeletons in the context of the Hong Kong construction industry	2018	$Tc_{84}A_{45}$	-	$cc_{103}$	-
69	Mapping and localization module in a mobile robot for insulating building crawl spaces	2018	$Tc_{142}A_{46}$	$s_{14}$	$cc_{110}$	-
70	Study on down-cutting ladder trencher of an underwater construction robot for seabed application	2018	$Tc_{174}A_{55}$		$cc_{113}$	-
71	SLAM-driven intelligent autonomous mobile robot navigation for construction applications	2018	$Tc_{107}A_{32}$	$s_{29}$	$cc_{118}$	-
72	Building an integrated mobile robotic system for real-time applications in construction	2018	$Tc_{38}A_{32}$	$s_{39}$	$cc_{118}$	-
73	Vision-based integrated mobile robotic system for real-time applications in construction	2018	$Tc_{38}A_{32}$	$s_{39}$	$cc_{118}$	-
74	Implementation of Admittance Control on a Construction Robot Using Load Cells	2018	$Tc_{233}A_{43}$	$s_6$	$cc_{17}$	-
75	The study on the integrated control system for curtain wall building façade cleaning robot	2018	$Tc_{17}A_{11}$	$s_{28}$	$cc_{31}$	-
76	Modular data communication methods for a robotic excavator	2018	$Tc_{225}A_7$	$s_{48}$	$cc_{31}$	-
77	Large-scale 3D printing by a team of mobile robots	2018	$Tc_{45}A_{18}$	$s_{39}$	$cc_{44}$	-

78	MAP - A Mobile Agile Printer Robot for on-site Construction	2018	$T_{c50}A_{18}$	$s_{48}$	$\mathcal{C}_{44}$	-
79	Active control strategy for trenching work of track-based underwater construction robot	2018	$T_{c178}A_{55}$	$s_6$	$\mathcal{C}_5$	-
80	The Autonomous Vehicle CELiNA as Educational Platform on Final Works in Computer Science	2018	$T_{c103}A_{32}$	$s_{109}$	$\mathcal{C}_{73}$	-
81	Real-time simulation of construction workers using combined human body and hand tracking for robotic construction worker system	2018	$T_{c150}A_{50}$	$s_{146}$	$\mathcal{C}_{73}$	-
82	Multimodal Trip Hazard Affordance Detection on Construction Sites	2018	$T_{c127}A_{39}$	$s_{158}$	$\mathcal{C}_{73}$	-
83	Stacked hourglass networks for markerless pose estimation of articulated construction robots	2018	$T_{c32}A_{51}$	$s_{39}$	$\mathcal{C}_{73}$	-
84	Industrial Robot Control with Object Recognition based on Deep Learning	2018	$T_{c32}A_{59}$	$s_{39}$	$\mathcal{C}_{73}$	-
85	Automated defect classification in sewer closed circuit television inspections using deep convolutional neural networks	2018	$T_{c32}A_6$	$s_{39}$	$\mathcal{C}_{73}$	-
86	Synthesis of the AC and DC Drives Fault Diagnosis Method for the Cyber-physical Systems of Building Robots	2018	$T_{c76}A_{36}$	-	$\mathcal{C}_{73}$	-
87	A cyber-physical system of diagnosing electric drives of building robots	2018	$T_{c76}A_{36}$		$\mathcal{C}_{73}$	-
88	Concept studies of automated construction using cable-driven parallel robots	2018	$T_{c73}A_{22}$	$s_{14}$	$\mathcal{C}_{75}$	-
89	Design of Robot based Work Progress Monitoring System for the Building Construction Site	2018	$T_{c37}A_{13}$	$s_{29}$	$\mathcal{C}_{75}$	-
90	BIM plus Robot Creates a New Era of Building Construction	2018	$T_{c21}A_{15}$	-	$\mathcal{C}_{75}$	-
91	UAV-Enabled Site-to-BIM Automation: Aerial Robotic- and Computer Vision-Based Development of As-Built/As-Is BIMs and Quality Control	2018	$T_{c21}A_{15}$	-	$\mathcal{C}_{75}$	-
92	Perspectives on a BIM-integrated software platform for robotic construction through Contour Crafting	2018	$T_{c21}A_{63}$	-	$\mathcal{C}_{75}$	-
93	Information modeling of an underground laboratory for the R&D of mining automation and tunnel construction robotics	2018	$T_{c21}A_9$	-	$\mathcal{C}_{75}$	-
94	Dynamics modeling and structural analysis of underwater construction robot	2018	$T_{c198}A_{55}$	$s_6$	$\mathcal{C}_{79}$	-
95	Workpiece Modeling for Adaptive Robotized Construction Work	2018	$T_{c12}A_{43}$	$s_{129}$	$\mathcal{C}_{82}$	-
96	Adaptive perception and modeling for robotized construction joint filling	2018	$T_{c12}A_{43}$	$s_{129}$	$\mathcal{C}_{82}$	-

97	Enhancing perceived safety in human-robot collaborative construction using immersive virtual environments	2018	$Tc_{69}A_{22}$	-	$cc_{82}$	-
98	Teleoperated construction robot using visual support with drones	2018	$Tc_{203}A_{56}$	$s_{39}$	$cc_{86}$	-
99	FOAM Custom Single Task Construction Robot	2018	$Tc_{86}A_{34}$	-	$cc_{86}$	-
100	A propulsion performance test of underwater construction robot light work ROV uri-L in circulation water channel	2018	$Tc_{173}A_{55}$	$s_6$	$cc_9$	-
101	Improved productivity, efficiency and cost savings following implementation of drone technology in the surveying industry	2018	$Te_{14}A_{35}$	-	$ce_{14}$	-
102	Framework for human performance analysis in Unmanned Aircraft System (UAS) operations in dynamic construction environment	2018	$Te_{15}A_{16}$	-	$ce_{15}$	-
103	Floor cleaning robot with reconfigurable mechanism	2018	$Th_{99}A_{45}$	$a_3$	$b_{37}$	$ch_2$
104	Development of a robot for boiler tube inspection	2018	$Th_{154}A_6$	$a_3$	$b_{46}$	$ch_2$
105	Glass facade cleaning robot with passive suction cups and self-locking trapezoidal lead screw drive	2018	$Th_{98}A_{45}$	$a_3$	$b_{19}$	$ch_2$
106	Automatic inspection of embankment by crawler-type mobile robot	2018	$Th_{133}A_6$	$a_3$	$b_3$	$ch_2$
107	Automatic traveling method for the self-propelled tunnel inspection system	2018	$Th_2A_6$	$a_3$	$b_{52}$	$ch_2$
108	Localisation of a mobile robot for bridge bearing inspection	2018	$Th_{22}A_6$	$a_3$	$b_{32}$	$ch_2$
109	Tunnel structural inspection and assessment using an autonomous robotic system	2018	$Th_4A_6$	$a_3$	$b_2$	$ch_2$
110	CU-brick cable-driven robot for automated construction of complex brick structures: From simulation to hardware realisation	2018	$Th_{42}A_{22}$	$a_6$	$b_{53}$	$ch_2$
111	Process analysis of cable-driven parallel robots for automated construction	2018	$Th_{44}A_{22}$	$a_6$	$b_{26}$	$ch_2$
112	Cable-driven parallel robot for curtain wall modules automatic installation	2018	$Th_{16}A_{11}$	$a_6$	$b_{25}$	$ch_2$
113	On the Improvements of a Cable-Driven Parallel Robot for Achieving Additive Manufacturing for Construction	2018	$Th_{76}A_{34}$	$a_6$	$b_{25}$	$ch_2$
114	A Changeable Jig-Less Welding Cell for Subassembly of Construction Machinery	2018	$Th_{114}A_{54}$	-	$b_{14}$	$ch_2$
115	Robotic inspection tests of tunnel lining concrete with crack light-section device on variable guide frame	2018	$Th_{132}A_6$	-	$b_{72}$	$ch_2$
116	Concrete inspection systems using hammering robot imitating sounds of workers	2018	$Th_{132}A_6$	-	$b_{72}$	$ch_2$



117	Robotic application of foam concrete onto bare wall elements - Analysis, concept and robotic experiments	2018	$Th_{64}A_{11}$	-	$b_{13}$	$ch_2$
118	Improvement of the mobile robot location dedicated for habitable house construction by 3D printing	2018	$Th_{54}A_{11}$	-	$b_{27}$	$ch_2$
119	Feasibility study for drone-based masonry construction of real-scale structures	2018	$Th_{46}A_{22}$	-	$b_{58}$	$ch_2$
120	Planetary Lego: Designing a Construction Block from a Regolith Derived Feedstock for In Situ Robotic Manufacturing	2018	$Th_{23}A_{30}$	-	$b_{32}$	$ch_2$
121	Automatic multi-image stitching for concrete bridge inspection by combining point and line features	2018	$Th_{77}A_6$	-	$b_2$	$ch_2$
122	Smart construction robot technology to improve construction and safety in outer walls of high-rise buildings	2018	$Th_{28}A_{19}$	-	-	$ch_2$
123	Automation of the execution of monolithic reinforced ceilings	2018	$Th_{28}A_{28}$	-	-	$ch_2$
124	A semi-autonomous mobile robot for bridge inspection	2018	$Th_{125}A_6$	$a_3$	$b_{73}$	$ch_3$
125	Construction and usage of three-dimensional data for road structures using terrestrial laser scanning and UAV with photo grammetry	2019	$Tc_{212}A_6$	$s_{54}$	$cc_{106}$	-
126	Framework for automated registration of UAV and UGV point clouds using local features in images	2019	$Tc_{131}A_{36}$	$s_{39}$	$cc_{110}$	-
127	Monocular Vision-Based Parameter Estimation for Mobile Robotic Painting	2019	$Tc_{94}A_{11}$	$s_{29}$	$cc_{118}$	-
128	Implementation of an augmented reality AR workflow for human robot collaboration in timber prefabrication	2019	$Tc_{123}A_{24}$	$s_{48}$	$cc_{118}$	-
129	An Occupancy Grid Mapping enhanced visual SLAM for real-time locating applications in indoor GPS-denied environments	2019	$Tc_{108}A_{24}$	$s_{54}$	$cc_{118}$	-
130	Collaborative Welding System using BIM for Robotic Reprogramming and Spatial Augmented Reality	2019	$Tc_{139}A_{54}$	$s_{19}$	$cc_{22}$	-
131	Towards mobile projective AR for construction co-robots	2019	$Tc_{133}A_{33}$	$s_{39}$	$cc_{22}$	-
132	Construction of the Remote Welding System based on Power Line Communication	2019	$Tc_{159}A_{54}$	-	$cc_{23}$	-

133	Man-machine Cooperation of Building Robot Based on Interactive Force Information	2019	$T_{c14}A_{11}$	$s_{31}$	$\mathcal{C}_{34}$	-
134	3D printing for construction based on a complex wall of polymer-foam and concrete	2019	$T_{c44}A_{11}$	-	$\mathcal{C}_{44}$	-
135	Large-scale digital concrete construction – CONPrint3D concept for on-site, monolithic 3D-printing	2019	$T_{c44}A_{18}$	-	$\mathcal{C}_{44}$	-
136	Measuring and positioning system design of robotic floor-tiling	2019	$T_{c60}A_2$	$s_{14}$	$\mathcal{C}_{46}$	-
137	Tip Localization Analysis for Mobile Manipulator in Construction Field	2019	$T_{c60}A_{29}$	$s_{14}$	$\mathcal{C}_{46}$	-
138	Soft Additive Fabrication Processes: Material Indeterminacy in 3D Printing	2019	$T_{c90}A_{29}$	$s_{39}$	$\mathcal{C}_{58}$	-
139	Vision-Based Obstacle Removal System for Autonomous Ground Vehicles Using a Robotic Arm	2019	$T_{c102}A_{32}$	$s_{39}$	$\mathcal{C}_{66}$	-
140	Computer vision for real-time extrusion quality monitoring and control in robotic construction	2019	$T_{c32}A_{15}$	$s_{39}$	$\mathcal{C}_{73}$	-
141	Real-Time Scene Segmentation Using a Light Deep Neural Network Architecture for Autonomous Robot Navigation on Construction Sites	2019	$T_{c32}A_{32}$	$s_{39}$	$\mathcal{C}_{73}$	-
142	LNSNet: Lightweight navigable space segmentation for autonomous robots on construction sites	2019	$T_{c32}A_{32}$	$s_{39}$	$\mathcal{C}_{73}$	-
143	Vision-based estimation of excavator manipulator pose for automated grading control	2019	$T_{c32}A_{50}$	$s_{39}$	$\mathcal{C}_{73}$	-
144	A vision-based marker-less pose estimation system for articulated construction robots	2019	$T_{c32}A_{51}$	$s_{39}$	$\mathcal{C}_{73}$	-
145	Analytical design of an underwater construction robot on the slope with an up-cutting mode operation of a cutter bar	2019	$T_{c4}A_{50}$	$s_6$	$\mathcal{C}_{73}$	-
146	Automated Brick Pattern Generator for Robotic Assembly using Machine Learning and Images	2019	$T_{c76}A_{22}$	-	$\mathcal{C}_{73}$	-
147	Teaching robots to perform construction tasks via learning from demonstration	2019	$T_{c76}A_{28}$	-	$\mathcal{C}_{73}$	-
148	Semantic Relation Detection between Construction Entities to Support Safe Human-Robot Collaboration in Construction	2019	$T_{c76}A_{33}$	-	$\mathcal{C}_{73}$	-

149	Formulation of the optimization problem of the cyber-physical diagnosis system configuration level for construction mobile robots	2019	$T_{c76}A_{36}$	-	$cc_{73}$	-
150	Automatic acquisition of point clouds of construction sites and its application in autonomous interior finishing robot	2019	$T_{c206}A_{58}$	$s_{19}$	$cc_{75}$	-
151	Robotic construction & Prototyping of a 3D-printed Mars surface habitat	2019	$T_{c92}A_{30}$	$s_{54}$	$cc_{75}$	-
152	An Automated System for Projection of Interior Construction Layouts	2019	$T_{c92}A_{38}$	$s_{54}$	$cc_{75}$	-
153	Game Simulation to Support Construction Automation in Modular Construction Using BIM and Robotics Technology-Stage I	2019	$T_{c21}A_{37}$	-	$cc_{75}$	-
154	Flexible virtual fixtures for human-excavator cooperative system	2019	$T_{c193}A_{56}$	$s_{140}$	$cc_{77}$	-
155	YouWasps: Towards Autonomous Multi-Robot Mobile Deposition for Construction	2019	$T_{c163}A_{50}$	$s_{84}$	$cc_{79}$	-
156	Planning and Execution for Geometrically Adaptive BIM-Driven Robotized Construction Processes	2019	$T_{c69}A_{43}$	$s_{54}$	$cc_{82}$	-
157	Autonomous motion planning and task execution in geometrically adaptive robotized construction work	2019	$T_{c69}A_{43}$	$s_{54}$	$cc_{82}$	-
158	Dynamic analysis of high precision construction cable-driven parallel robots	2019	$T_{c235}A_{50}$	-	$cc_{83}$	-
159	Development of an earthmoving machinery autonomous excavator development platform	2019	$T_{c146}A_5$	$s_{84}$	$cc_{85}$	-
160	Robotic autonomous systems for earthmoving in military applications	2019	$T_{c146}A_5$	$s_{84}$	$cc_{85}$	-
161	Determinants of Adoption of Robotics in Precast Concrete Production for Buildings	2019	$T_{c86}A_{16}$	-	$cc_{86}$	-
162	Trajectory adaptation for an impedance controlled cooperative robot according to an operator's force	2019	$T_{c8}A_{10}$	$s_6$	$cc_{89}$	-
163	The analysis of factors influencing on efficiency of applying mobile bricklaying robots and tools for such analysis	2019	$Te_3A_{22}$	-	$ce_3$	-
164	Dual-arm construction robot with remote-control function	2019	$Th_{87}A_{42}$	$a_2$	$b_{61}$	$ch_1$
165	Efforts to unmanned construction for post-disaster restoration and reconstruction	2019	$Th_{86}A_{42}$	-	$b_3$	$ch_1$
166	Control of a hyper-redundant robot for quality inspection in additive	2019	$Th_{135}A_6$	$a_1$	$b_{15}$	$ch_2$
167	A novel holonomic mobile manipulator robot for construction sites	2019	$Th_{69}A_{60}$	$a_2$	$b_{76}$	$ch_2$

168	Self-reconfigurable façade-cleaning robot equipped with deep-learning-based crack detection based on convolutional neural networks	2019	$Th_{101}A_{45}$	$a_3$	$b_{38}$	$ch_2$
169	Four-wheel steering and driving mechanism for a reconfigurable floor cleaning robot	2019	$Th_{100}A_{45}$	$a_3$	$b_{39}$	$ch_2$
170	Design and modelling of a modular window cleaning robot	2019	$Th_{103}A_{45}$	$a_3$	$b_{40}$	$ch_2$
171	Parallel 2-DoF manipulator for wall-cleaning applications	2019	$Th_{102}A_{45}$	$a_3$	$b_{41}$	$ch_2$
172	Mobile robot for marking free access floors at construction sites	2019	$Th_{79}A_{38}$	$a_3$	$b_{79}$	$ch_2$
173	Development of automated mobile marking robot system for free access floor	2019	$Th_{79}A_{38}$	$a_3$	$b_{79}$	$ch_2$
174	QuicaBot: Quality Inspection and Assessment Robot	2019	$Th_{134}A_6$	$a_3$	$b_{13}$	$ch_2$
175	Labview based brick laying robot	2019	$Th_{48}A_{22}$	$a_3$	$b_{36}$	$ch_2$
176	Design, modelling and simulation of novel hexapod-shaped passive damping system for coupling cable robot and end effector in curtain wall module installation application	2019	$Th_{17}A_{11}$	$a_6$	$b_{28}$	$ch_2$
177	Investigation of robot systems in masonry construction [Baubetriebliche Untersuchung von Robotersystemen im Mauerwerksbau]	2019	$Th_{16}A_{22}$	$a_6$	$b_{25}$	$ch_2$
178	Indoor visualization experiments at building construction site using high safety UAV	2019	$Th_{46}A_6$	-	$b_{58}$	$ch_2$
179	Automatic brick masonry system and its application in on-site construction	2019	$Th_{51}A_{22}$	-	$b_{30}$	$ch_2$
180	Towards Automated Installation of Reinforcement Using Industrial Robots	2019	$Th_{14}A_{44}$	-	$b_7$	$ch_2$
181	Robotic fabrication of nail laminated timber	2019	$Th_{77}A_{37}$	-	$b_2$	$ch_2$
182	Adaptive automation strategies for robotic prefabrication of parametrized mass timber building components	2019	$Th_{77}A_{37}$	-	$b_2$	$ch_2$
183	Construction waste recycling robot for nails and screws: Computer vision technology and neural network approach	2019	$Th_{77}A_{41}$	-	$b_2$	$ch_2$
184	In-situ construction method for lunar habitation: Chinese Super Mason	2019	$Th_{28}A_{30}$	-		$ch_2$
185	User interfaces for human-robot interaction in field robotics	2019	$Th_{21}A_{13}$	-	$b_{31}$	$ch_3$
186	An autonomous robotic platform for automatic extraction of detailed semantic models of buildings	2020	$Tc_{208}A_{59}$	$s_{54}$	$cc_{110}$	-

187	LiDAR-equipped UAV path planning considering potential locations of defects for bridge inspection	2020	$T_{c_{213}A_6}$	$S_{79}$	$\mathcal{C}_{110}$	-
188	An integrated UGV-UAV system for construction site data collection	2020	$T_{c_{101}A_{32}}$	$S_{144}$	$\mathcal{C}_{118}$	-
189	Construction of SLAM Algorithm for Window Cleaning Robot Moving Along Window Frame	2020	$T_{c_{101}A_{45}}$	$S_{144}$	$\mathcal{C}_{118}$	-
190	A scene-adaptive descriptor for visual SLAM-based locating applications in built environments	2020	$T_{c_{38}A_{46}}$	$S_{39}$	$\mathcal{C}_{118}$	-
191	Cooperative Aerial-Ground Multi-Robot System for Automated Construction Tasks	2020	$T_{c_{123}A_{11}}$	$S_{48}$	$\mathcal{C}_{118}$	-
192	Automated Defect Quantification in Concrete Bridges Using Robotics and Deep Learning	2020	$T_{c_{36}A_{12}}$	$S_{79}$	$\mathcal{C}_{118}$	-
193	Development of construction robots using crazyflie	2020	$T_{c_{39}A_{14}}$	-	$\mathcal{C}_{118}$	-
194	Robotic 3D clay printing of prefabricated non-conventional wall components based on a parametric-integrated design	2020	$T_{c_{16}A_{11}}$	-	$\mathcal{C}_{32}$	-
195	Inspecting manufacturing precision of 3D printed concrete parts based on geometric dimensioning and tolerancing	2020	$T_{c_{46}A_{16}}$	$S_{144}$	$\mathcal{C}_{44}$	-
196	Automation in the Construction of a 3D-Printed Concrete Wall with the Use of a Lintel Gripper	2020	$T_{c_{44}A_{16}}$	-	$\mathcal{C}_{44}$	-
197	Bricklaying robot moving algorithms at a construction site	2020	$T_{c_{44}A_{22}}$	-	$\mathcal{C}_{44}$	-
198	Additive manufacturing of cantilever - From masonry to concrete 3D printing	2020	$T_{c_{44}A_{22}}$	-	$\mathcal{C}_{44}$	-
199	Generalized task allocation and route planning for robots with multiple depots in indoor building environments	2020	$T_{c_{33}A_{24}}$	-	$\mathcal{C}_{49}$	-
200	The problem of manipulation and angular orientation of gripping devices of construction robots	2020	$T_{c_{85}A_{50}}$	-	$\mathcal{C}_{50}$	-
201	Optimization of Grasping Efficiency of a Robot Used for Sorting Construction and Demolition Waste	2020	$T_{c_{129}A_{41}}$	$S_{54}$	$\mathcal{C}_{64}$	-
202	Generic design aided robotically facade pick and place in construction site dataset	2020	$T_{c_{116}A_{34}}$		$\mathcal{C}_{70}$	-
203	A General Approach for Automating Teleoperated Construction Machines	2020	$T_{c_{188}A_{56}}$	$S_{139}$	$\mathcal{C}_{73}$	-
204	Direct-visual-operation support system for unmanned construction	2020	$T_{c_{188}A_{56}}$	$S_{139}$	$\mathcal{C}_{73}$	-

205	Robot construction simulation using deep reinforcement learning+B21B4:B22B6B4:B20B4:B24BB4:B20	2020	$T_{c153}A_{50}$	$s_{18}$	$\mathcal{C}73$	-
206	Measurement for cracks at the bottom of bridges based on tethered creeping unmanned aerial vehicle	2020	$T_{c32}A_{12}$	$s_{39}$	$\mathcal{C}73$	-
207	Proximity Prediction of Mobile Objects to Prevent Contact-Driven Accidents in Co-Robotic Construction	2020	$T_{c32}A_{24}$	$s_{39}$	$\mathcal{C}73$	-
208	Augmented drawn construction symbols: A method for ad hoc robotic fabrication	2020	$T_{c32}A_{37}$	$s_{39}$	$\mathcal{C}73$	-
209	Teaching robots to perform quasi-repetitive construction tasks through human demonstration	2020	$T_{c130}A_{28}$	$s_{54}$	$\mathcal{C}73$	-
210	Deep learning of grasping detection for a robot used in sorting construction and demolition waste	2020	$T_{c130}A_{41}$	$s_{54}$	$\mathcal{C}73$	-
211	Vision-based robotic system for on-site construction and demolition waste sorting and recycling	2020	$T_{c130}A_{41}$	$s_{54}$	$\mathcal{C}73$	-
212	Structural stay-in-place formwork for robotic in situ fabrication of non-standard concrete structures: A real scale architectural demonstrator	2020	$T_{c75}A_{16}$	-	$\mathcal{C}73$	-
213	Complete coverage path planning using reinforcement learning for Tetromino based cleaning and maintenance robot	2020	$T_{c76}A_{24}$	-	$\mathcal{C}73$	-
214	What lies beneath: Material classification for autonomous excavators using proprioceptive force sensing and machine learning	2020	$T_{c76}A_{29}$	-	$\mathcal{C}73$	-
215	Agent based modeling to optimize workflow of robotic steel and concrete 3D printers	2020	$T_{c33}A_8$	-	$\mathcal{C}73$	-
216	Combining the Robot Operating System with Building Information Modeling for Robotic Applications in Construction Logistics	2020	$T_{c143}A_{48}$	$s_{17}$	$\mathcal{C}75$	-
217	BIM-based task-level planning for robotic brick assembly through image-based 3D modeling	2020	$T_{c74}A_{22}$	$s_{39}$	$\mathcal{C}75$	-
218	Bond properties of reinforcing bar penetrations in 3D concrete printing	2020	$T_{c227}A_{16}$	-	$\mathcal{C}93$	-
219	Sampling robot for primary circuit pipelines of decommissioned nuclear facilities	2020	$T_{c65}A_{21}$	$s_{80}$	$\mathcal{C}95$	-
220	A Comprehensive Performance Evaluation of Different Mobile Manipulators Used as Displaceable 3D Printers of Building Elements for the Construction Industry	2020	$T_{e13}A_{35}$	-	$\mathcal{C}13$	-
221	Determining a numerical efficiency indicator for a mobile bricklaying robot	2020	$T_{e2}A_{22}$	-	$\mathcal{C}2$	-

222	Life cycle cost analysis of the steel pipe pile head cutting robot	2020	$Te_8A_{21}$	-	$ce_8$	-
223	Controller area network standard for unmanned ground vehicles hydraulic systems in construction applications	2020	$Th_{158}A_{36}$	$a_2$	$b_{27}$	$ch_1$
224	Flexible and transportable robotic timber construction platform – TIM	2020	$Th_{78}A_{37}$	$a_3$	$b_{48}$	$ch_2$
225	Automated manufacturing for timber-based panelised wall systems	2020	$Th_{155}A_{37}$	-	$b_{50}$	$ch_2$
226	Development of an automatic sorting robot for construction and demolition waste	2020	$Th_{83}A_{41}$	-	$b_{60}$	$ch_2$
227	Construction of land base station for uav maintenance automation	2021	$Tc_{52}A_{19}$	$s_{39}$	$cc_{117}$	-
228	Robotic spray coating of self-sensing metakaolin geopolymer for concrete monitoring	2021	$Tc_{63}A_{16}$	$s_{39}$	$cc_{39}$	-
229	Automation of the construction process by using a hinged robot with interchangeable nozzles	2021	$Th_{51}A_{22}$	-	$b_{30}$	$ch_2$