Contents

1	Introduction	1
1.1	Benefits of Precast Insulated Sandwich Panels	3
1.2	Understanding Thermal Mass	7
1.3	Understanding Acoustics	9
1.4	Global use of Precast Insulated Sandwich Panels	10
2	Definitions and notations	16
3	Energy efficiency, materials, humidity, and acoustic performance	20
3.1	Introduction	20
3.2	Energy efficiency demands	22
	1 Cold climate	22
3.2.	2 Hot climate	22
3.3	Insulation materials	24
3.4	Panel connectors	26
4	Structural design and detailing	28
4.1	Introduction	28
4.2	General Rules	30
4.3	Structural Behaviour	31
4.3.	1 General	31
	2 Non-Composite Precast Insulated Sandwich Panels	32
4.3.	3 Composite and Partially Composite Precast Insulated Sandwich Panels	34
4.4	Precast Insulated Sandwich Panel Applications	38
4.5	Wythe Design	40
	1 General	40
	2 Loadbearing Precast Insulated Sandwich Panels	40
	3 Non-Loadbearing Precast Insulated Sandwich Panels	44
4.6	Wythe Connectors	45
	1 General	45
	2 Shear Connectors 3 Non-Shear Connectors	46 50
4.7	Other Considerations	52
4.7		52
4.7.	,	52
4.7.		53
5	Manufacture of Sandwich Panels	54
5.1	General	54
5.2	Typical production process	54
2.4		21

5.3	Preparation of production and erection drawings	58
5.4	Manufacturing facilities	59
5.4.1	Formwork / Moulds	60
5.5	Reinforcement	61
5.5.1	Reinforcement cage assemblies	61
5.5.2	Prestressing	62
5.6	Concrete Placement	62
5.6.1	Transportation	62
5.6.2	5 5	63
	Consolidation	63
5.6.4	5	64
5.7	Surface Finishes	64
5.7.1	General Methods	66
5.7.2		66
	Abrasive blasting to expose aggregate	68
5.7.4		69
5.7.5	6	70
5.8	Concrete Curing	71
5.8.1	Curing recommendations	71
5.8.2	Curing techniques	72
5.9	Storage	72
		<u> </u>
6 T	ransport and Installation	74
6 T 6.1	ransport and Installation General	74 74
6.1	General	
6.1	•	74
6.1 6.2	General Transport and Delivery Planning and Preparation	74 75
6.1 6.2 6.3	General Transport and Delivery	74 75 77
6.1 6.2 6.3 6.4	General Transport and Delivery Planning and Preparation Panel Handling and Site Storage General	74 75 77 78
6.1 6.2 6.3 6.4 6.4.1	General Transport and Delivery Planning and Preparation Panel Handling and Site Storage General Delivery sequence	74 75 77 78 78
6.1 6.2 6.3 6.4 6.4.1 6.4.2	General Transport and Delivery Planning and Preparation Panel Handling and Site Storage General Delivery sequence	74 75 77 78 78 79
6.1 6.2 6.3 6.4 6.4.1 6.4.2 6.4.3	General Transport and Delivery Planning and Preparation Panel Handling and Site Storage General Delivery sequence Lifting devices	74 75 77 78 78 78 79 80
6.1 6.2 6.3 6.4 6.4.1 6.4.2 6.4.3 6.5	General Transport and Delivery Planning and Preparation Panel Handling and Site Storage General Delivery sequence Lifting devices Jobsite Storage General Panel support	74 75 77 78 78 79 80 80
6.1 6.2 6.3 6.4 6.4.1 6.4.2 6.4.3 6.5 6.5.1	General Transport and Delivery Planning and Preparation Panel Handling and Site Storage General Delivery sequence Lifting devices Jobsite Storage General Panel support Storage on delivery vehicle	74 75 77 78 78 79 80 80 80
$\begin{array}{c} 6.1 \\ 6.2 \\ 6.3 \\ 6.4 \\ 6.4.1 \\ 6.4.2 \\ 6.4.3 \\ 6.5 \\ 6.5.1 \\ 6.5.2 \end{array}$	General Transport and Delivery Planning and Preparation Panel Handling and Site Storage General Delivery sequence Lifting devices Jobsite Storage General Panel support	74 75 77 78 78 79 80 80 80 80 81
$\begin{array}{c} 6.1 \\ 6.2 \\ 6.3 \\ 6.4 \\ 6.4.1 \\ 6.4.2 \\ 6.4.3 \\ 6.5 \\ 6.5.1 \\ 6.5.2 \\ 6.5.3 \\ 6.6 \\ 6.6.1 \end{array}$	General Transport and Delivery Planning and Preparation Panel Handling and Site Storage General Delivery sequence Lifting devices Jobsite Storage General Panel support Storage on delivery vehicle Panel Erection Workmanship	74 75 77 78 78 79 80 80 80 80 81 81 81 82 83
$\begin{array}{c} 6.1 \\ 6.2 \\ 6.3 \\ 6.4 \\ 6.4.1 \\ 6.4.2 \\ 6.4.3 \\ 6.5 \\ 6.5.1 \\ 6.5.2 \\ 6.5.3 \\ 6.6 \\ 6.6.1 \\ 6.6.2 \end{array}$	General Transport and Delivery Planning and Preparation Panel Handling and Site Storage General Delivery sequence Lifting devices Jobsite Storage General Panel support Storage on delivery vehicle Panel Erection Workmanship Equipment	74 75 77 78 78 79 80 80 80 80 81 81 81 81 82 83 84
$\begin{array}{c} 6.1 \\ 6.2 \\ 6.3 \\ 6.4 \\ 6.4.1 \\ 6.4.2 \\ 6.4.3 \\ 6.5 \\ 6.5.1 \\ 6.5.2 \\ 6.5.3 \\ 6.6 \\ 6.6.1 \\ 6.6.2 \\ 6.6.3 \end{array}$	General Transport and Delivery Planning and Preparation Panel Handling and Site Storage General Delivery sequence Lifting devices Jobsite Storage General Panel support Storage on delivery vehicle Panel Erection Workmanship Equipment Bracing and guying	74 75 77 78 78 79 80 80 80 80 80 81 81 81 81 82 83 84 84
$\begin{array}{c} 6.1 \\ 6.2 \\ 6.3 \\ 6.4 \\ 6.4.1 \\ 6.4.2 \\ 6.4.3 \\ 6.5 \\ 6.5.1 \\ 6.5.2 \\ 6.5.3 \\ 6.6 \\ 6.6.1 \\ 6.6.2 \\ 6.6.3 \\ 6.6.4 \end{array}$	General Transport and Delivery Planning and Preparation Panel Handling and Site Storage General Delivery sequence Lifting devices Jobsite Storage General Panel support Storage on delivery vehicle Panel Erection Workmanship Equipment Bracing and guying Alignment	74 75 77 78 78 79 80 80 80 80 81 81 81 82 83 84 84 84
$\begin{array}{c} 6.1 \\ 6.2 \\ 6.3 \\ 6.4 \\ 6.4.1 \\ 6.4.2 \\ 6.4.3 \\ 6.5 \\ 6.5.1 \\ 6.5.2 \\ 6.5.3 \\ 6.6 \\ 6.6.1 \\ 6.6.2 \\ 6.6.3 \\ 6.6.4 \\ 6.6.5 \end{array}$	General Transport and Delivery Planning and Preparation Panel Handling and Site Storage General Delivery sequence Lifting devices Jobsite Storage General Panel support Storage on delivery vehicle Panel Erection Workmanship Equipment Bracing and guying Alignment Bolted connections	74 75 77 78 78 79 80 80 80 80 81 81 81 82 83 84 84 87 87
$\begin{array}{c} 6.1 \\ 6.2 \\ 6.3 \\ 6.4 \\ 6.4.1 \\ 6.4.2 \\ 6.4.3 \\ 6.5 \\ 6.5.1 \\ 6.5.2 \\ 6.5.3 \\ 6.6 \\ 6.6.1 \\ 6.6.2 \\ 6.6.3 \\ 6.6.4 \\ 6.6.5 \\ 6.6.6 \end{array}$	General Transport and Delivery Planning and Preparation Panel Handling and Site Storage General Delivery sequence Lifting devices Jobsite Storage General Panel support Storage on delivery vehicle Panel Erection Workmanship Equipment Bracing and guying Alignment Bolted connections	74 75 77 78 78 79 80 80 80 80 80 81 81 81 81 82 83 84 84 87 87 88
$\begin{array}{c} 6.1 \\ 6.2 \\ 6.3 \\ 6.4 \\ 6.4.1 \\ 6.4.2 \\ 6.4.3 \\ 6.5 \\ 6.5.1 \\ 6.5.2 \\ 6.5.3 \\ 6.6 \\ 6.6.1 \\ 6.6.2 \\ 6.6.3 \\ 6.6.4 \\ 6.6.5 \end{array}$	General Transport and Delivery Planning and Preparation Panel Handling and Site Storage General Delivery sequence Lifting devices Jobsite Storage General Panel support Storage on delivery vehicle Panel Erection Workmanship Equipment Bracing and guying Alignment Bolted connections Welded connections	74 75 77 78 78 79 80 80 80 80 81 81 81 82 83 84 84 87 87

7	Inspection and Repair	90
7.1	General	90
7.2	Inspection at Manufacturing Plant	90
7.3	Dimensional Tolerances	91
7.4	Jobsite inspection of damage	95
7.5	Cleaning	97
7.5.1	Protection	97
7.5.2	Stubborn stains	97
7.5.3	Sandblasting and steam cleaning	98
7.5.4		98
7.6	Patching and Repair	98
7.6.1		98
	Repair considerations	99
	Chips and spalls	99
7.6.4	I	100
7.7	Joint Sealing (Caulking)	105
7.7.1	Joint preparation	105
	Sealant installation	106
7.7.3	6 7	107
7.8	Repair during Life-Cycle	108
	References	110
	Appendices	113
	Appendix A:Typical connections and details	113
	Appendix B: Design of connector/tie loads due to temperature differences in the outer wythe	118