

Contents

1	A Literature Review on the Causes of Construction Accidents . . .	1
1.1	A Review on Global Construction Industry	1
1.2	Causes of Construction Accidents.	2
1.2.1	Human	3
1.2.2	Economic Consideration	4
1.2.3	Hectic Schedule	4
1.2.4	Organizational Factor	5
1.2.5	Legislation and Legal Enforcement.	6
1.2.6	Insufficient Data.	6
1.2.7	Site Condition and Ergonomics	7
1.2.8	Weather.	7
1.3	Conclusion.	9
	References	9
2	Why Do Accidents Happen? A Critical Review on the Evolution of the Construction Accident Causation Models.	13
2.1	Introduction	13
2.2	Changes in Construction Industry 1960: Present.	13
2.2.1	From Low-Rise Building to the Tower of Babylon. . .	13
2.2.2	From Traditional Procurement to Integrated Procurement.	14
2.2.3	From Conventional Construction Method to Complicated Ever Changing Digital and Prefabricated Construction.	15
2.3	Evolution Theory	16
2.4	Accident Causation Models	16
2.4.1	Energy Model (1961)	16
2.4.2	Bird' Domino Model (1974)	17
2.4.3	Heinrich's Axioms (1980)	18
2.4.4	Potential Accident Subject Model (1987)	18

2.4.5	Rasmussen's Work Behavior Model (1994)	19
2.4.6	Human Information Processing Model (2000)	19
2.4.7	Epidemiological Model (2003)	20
2.4.8	Systems Model of Construction Accident Causation (2005)	21
2.5	Conclusion.	22
	References	22
3	Supply of Safety Measures in Developing and Developed Countries: A Global Perspective	25
3.1	Introduction	25
3.2	Global Review on Construction Safety Measures	27
3.2.1	Australia	27
3.2.2	Singapore	28
3.2.3	The United States	29
3.2.4	France	33
3.2.5	Bermuda	34
3.2.6	China	34
3.2.7	Ghana	35
3.2.8	Kuwait	36
3.2.9	Egypt	37
3.3	Conclusion.	38
	References	38
4	Effectiveness of Safety Measures in Reducing Construction Accident Rates	41
4.1	Introduction	41
4.2	Characteristics of Various Construction Safety Measures.	41
4.2.1	Total Quality Management Based Safety Management System (TQM Based SMS)	41
4.2.2	Behaviours Based Safety Management System (BBS)	42
4.2.3	Independent Safety Audit Scheme (ISAS)	42
4.2.4	The Occupational Health and Safety Assessment Series 18001 (OHSAS 18001)	43
4.2.5	Site Safety Supervision Plan System (SSSPS)	43
4.2.6	Site Safety Cycle (SSC)	44
4.2.7	Performance Assessment Scoring System (PASS).	44
4.2.8	Pay for Safety Schemes (PFSS)	45
4.2.9	Safety Education (SE), Safety Training (ST) and Safety Promotion (SP)	45
4.3	Research Method and Results	46
4.4	Conclusion.	47
	References	47

5	Senior and Junior Construction Personnel’s Point of View on Construction Safety.	49
5.1	Introduction	49
5.2	Objectives of Interviews	49
5.3	Causes of Construction Accidents.	50
5.3.1	Foreman’s and Workers’ Points of View: Human Factor	50
5.3.2	Middle Management Point of View: Poor Management.	50
5.3.3	Client’s Point of View: Lack of Site Safety Supervision	51
5.3.4	Other Causes of Accidents.	51
5.3.5	People at Different Levels View Accident Causes Differently	51
5.4	Safety Motivation.	51
5.4.1	Contractor’s Motivation for Working Safely	51
5.4.2	Middle Management’s Motivation for Working Safely.	52
5.4.3	Workers’ and Foremen’s Motivation for Working Safely.	52
5.5	Costs of Accidents/Possible Benefits of Safety Measures	52
5.6	Effectiveness of Various Safety Measures	53
5.6.1	Independent Safety Audit System (ISAS)	53
5.6.2	Occupational Health and Safety Audit System 18001	54
5.6.3	Pay for Safety System (PFSS)	56
5.6.4	Site Safety Cycle (SSC)	57
5.6.5	Safety Training (ST).	58
5.6.6	Safety Education	58
5.6.7	Safety Promotion	59
5.6.8	Performance Assessment Scoring Scheme	60
5.6.9	KYT	60
5.6.10	Total Quality Method-Based, Behaviors Based Safety-Based and Site Safety Supervision Plan System.	61
5.7	Critical Factors Affect the Effectiveness of Safety Measures.	61
5.7.1	Support from Site Agent/Project Manager	61
5.7.2	Attitude of Safety Team	61
5.8	Recommended Safety Measures	62
5.8.1	Adequate Training	62
5.8.2	Workers’ Views and Safety Measures Design	62
5.9	Discussion and Conclusion	62
	Reference	63

6	Case Studies on Safety Measures Implementation	65
6.1	Introduction	65
6.2	Objectives	65
6.3	Case 1: Route 8 Nam Wan Tunnel and West Tsing Yi Viaduct.	66
6.3.1	Safety Measures	66
6.3.2	Comments on Overall Effectiveness of Safety Measures	74
6.4	Case Study 2: Shatin New Road T3	77
6.4.1	Site Safety Cycle	77
6.4.2	Safety Promotion	78
6.4.3	Comments on Overall Effectiveness of Safety Measures	78
6.5	Case 3: Private Residence in Deep Bay.	79
	References	80
7	Using Web 2.0 to Share the Knowledge of Construction Safety as a Public Good in Nature Among Researchers: The Fable of Economic Animals	81
7.1	Introduction	81
7.2	Riding the Wave of Web 2.0	81
7.3	A Bird's Eye View on Construction Safety Knowledge.	84
7.4	Knowledge Sharing under the Lens of Economists	85
7.5	Resistance to Use Web 2.0 as Tools for Knowledge Sharing	85
7.6	The Nature of Motivation	86
7.7	Intrinsic Motivation	86
7.7.1	Game Theory and Construction Safety Knowledge Sharing.	87
7.7.2	Prisoners' Dilemma of Construction Safety Knowledge Sharing.	88
7.7.3	Chicken Game of Construction Safety Knowledge Sharing.	89
7.7.4	Assurance Game of Construction Safety Knowledge Sharing.	89
7.8	Extrinsic Motivation	90
7.9	A Battle Between Intrinsic and Extrinsic Motivators.	91
7.10	Conclusion.	92
	References	92
8	Future Motivation in Construction Safety Knowledge Sharing by Means of Information Technology	97
8.1	Introduction	97
8.2	Construction Safety Knowledge Sharing by IT.	97

8.3	Costs of Construction Accidents	98
8.4	Causes of Construction Accidents	100
8.5	Knowledge and Knowledge Sharing	100
8.6	Paradigm Shift in Knowledge Sharing	103
8.7	Possible Key Enabling/Emerging Technologies in Sharing Construction Safety Knowledge with the Help of IT.	104
8.7.1	Professional Web-Based Communities	104
8.7.2	Intranet	106
8.7.3	Online Safety Games	106
8.7.4	Virtual Classrooms	107
8.7.5	Blog	109
8.8	Who Moved My Cheese? The Major Barriers to Resist Change	109
8.9	Traditional Motivation Theories	109
8.9.1	Theory X.	110
8.9.2	Theory Y.	110
8.9.3	Reinforcement Theory.	111
8.9.4	Hierarchy of Needs Theory	111
8.9.5	Herzberg's Two-Factor Theory.	112
8.10	Foreseen Industrial Impacts and Conclusion.	113
	References	114
9	Demand for Construction Safety	117
9.1	A Global Review on Construction Accidents	117
9.2	Direct Costs in Construction Accidents	118
9.3	Indirect Costs in Construction Accidents	118
9.4	The Relationship Between Indirect and Direct Costs in Construction Accidents	119
9.5	Conclusion.	119
	References	120
10	Workers' Compensation for Non-fatal Construction Accidents: Review of Court Cases in Hong Kong	123
10.1	Introduction	123
10.2	Liability of Contractors on Workers' Safety under Common Law	124
10.3	Various Legislation in Relation to Construction Accident Compensation in Hong Kong	125
10.4	Research Method	126
10.5	Results	127
10.5.1	Age.	127
10.5.2	Mechanism of Injury.	128
10.5.3	Parts of Bodies Injured	128

10.5.4	Compensation Awarded in 2004–2008	129
10.6	Conclusion.	134
	References	134
11	Construction Accident Compensation in the United Kingdom . . .	137
11.1	The Rationale for Construction Accident Compensation	137
11.2	History of Legal Development in the UK Workers' Compensation	137
11.3	Modern Common Law Principle in Accident Compensation	139
11.3.1	Psychiatric Injury in Common Law	140
11.3.2	Is a Warning Sufficient to Relieve the Employers from Legal Responsibility?	140
11.4	UK's Legislation	141
11.5	Research Method	141
11.6	Results	142
11.6.1	Damages have to be Foreseeable	142
11.6.2	Reasonableness	142
11.6.3	Psychiatric Injury	143
11.6.4	Proximity	143
11.6.5	Time is of Essence	143
11.6.6	Volenti Non Fit Injuria	143
11.6.7	Degree of Responsibility	144
11.6.8	Deceit	144
11.7	Conclusion.	144
	References	151
12	Job Burnout and Safety Performance in the Hong Kong Construction Industry	153
12.1	Burnout and Safety	153
12.2	Findings	154
12.3	Summary	155
	References	155
	Subject Index	157