

Integrated Design & Construction

– Single Responsibility

A Code of Practice

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Foreword

The code of practice for Integrated Design and Construction-Single Responsibility (IDCsr) integrates within a single team all the key participants involved in the process of designing and constructing a successful project. The objective of the team is a focus on delivering the end product within pre-defined parameters. This marks the final extension of the paradigm shift initiated by Sir Michael Latham almost two decades ago and then further developed by Sir John Egan.

This document describes the next logical step by outlining a practical way of delivering a product through effective collaboration between the professionals involved. This is done by effectively merging the various stages of traditional design and project management. Resonance of many of the themes and concepts incorporated can be found in recent innovative procurement models being supported by the Cabinet Office. In the private sector, the practice of an integrated team approach, particularly where a single entity is responsible for design, delivery and operation, has already found its niche in a variety of sectors.

I congratulate the initiative and efforts of Colin Harding, PPCIOB and his team whose knowledge, experience and vision have been instrumental in creating this pioneering Code of Practice as the most comprehensive document formulating the practical application of a single responsibility team approach in the built environment.

I am pleased that the CIOB is continuing to lead from the front in the collective effort to drive the necessary culture changes in the industry, and this Code of Practice will stimulate significant improvements to the processes and practices of project design, delivery and management in the built environment.

James Wates CBE,FCIOB,FRICS,FICE,FCGI,FRSA
President (2010-2011) CIOB
Chairman, Wates Group
Chairman, CITB
Chairman, UKCG
Chairman, BRE Trust

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Sir Michael Latham: for 'Constructing the Team', which first raised awareness that the fragmented construction industry could at least collaborate, leading to a steady growth of Design & Build systems.

Sir John Egan: who in 'Rethinking Construction' introduced the notion of Lean Management practice to completely integrate the design and construction teams.

Glossary of terms and acronyms

Acronym	Full name	Summary role description
BIM	Building information modelling	An electronic design system and shared virtual workspace that enables everyone in the client and IDCC teams to fully and openly collaborate on the design and its build-ability
CAD	Computer aided design	The basic form of electronic design system
CDM	Construction design and management regulations 2007	Design safety regulations
CoP	Code of practice	This document
CPS	Client project sponsor	The overall leader of the client team
CTM	Client team manager	The client team project leader and advisor throughout the project
FM	Facilities management	The on going management of completed facilities and their services
GSL	Government soft landings	Planning system designed to ensure a smooth commissioning, handover and operational process
H&S	Health and safety	Health and safety generic
ICT	Information and communication technology	Electronic technology for the efficient administration of distributed, personal, team and project information
IDCC	IDCsr constructor	The legal entity that takes full responsibility for the design and construction of the project/product
IDCPI	IDCsr project insurance	Project insurance cover designed specifically for IDCsr projects
IDCsr	Integrated design and construction – single responsibility	The system and process
IDCPM	IDCC’s project manager	The leader of the IDCC team and the project
IPI	Integrated project insurance	The insurance cover developed for Government Construction Strategy collaborative projects

Acronym	Full name	Summary role description
IT	Information technology	The foundation of modern business
OGC	Office of government commerce	Government department
O&M	Operational and maintenance	Operation and maintenance of the completed facility
PBA	Project bank account	A form of Escrow Account that ring-fences client payments to ensure all suppliers are paid directly in accordance with the agreed payment terms
PD	Project definition	To provide the clearest and most detailed description of what the client really needs and wants from the project
PQP	Project quality plan	Detailed plan to implement the QMS
QMS	Quality management system	A project specific strategy to target the achievement of total 'right first time' quality assurance throughout the project
SPV	Special purpose vehicle	The project specific 'clean company' form that most IDCC legal entities will take
SWMP	Site waste management plan	An efficient resource management and recycling tool
VM	Value management	The structured analysis of the ways in which functionality can be achieved at minimum cost

Introduction

The construction industry's relative costs have steadily risen over the last 50 years or so, while profit margins of its contractors and sub-contractors have been eroded to the level that is no longer sufficient to justify significant external investment. Numerous reports have identified fragmentation of the industry's management structures and processes as the underlying cause of the waste and inefficiencies that keep costs so high and margins so low. Despite several well-meaning attempts, a system that genuinely reintegrates those structures and processes has never been made available until now.

Single Responsibility Integrated Design and Construction (IDCsr) is a totally integrated yet competitive form of procurement, design and project delivery for construction Clients and IDCsr Constructors (IDCCs). Every practitioner necessary for the effective and efficient design and construction of the project is employed or engaged by the IDCC Company. The leader of the IDCC team, and therefore the whole process, is the IDCsr Project Manager (IDCPM). Some of the key issues for which the IDCPM is responsible include dealing directly with the Client and Client Team Manager (CTM), welding all the IDCC's practitioners into a lean, wholly integrated production team and on behalf of the IDCC company accepting full responsibility for the design and delivery of the complete project, backed by the IDCsr Project Insurance policy cover.

With all designers securely embedded within this integrated structure, Client need, particularly cost certainty, will take precedence over design-centric aspirations. The IDCsr Sale Agreement Model Terms and Conditions are therefore based on the sale and purchase of a customised finished product at a pre-agreed fixed price. The IDCsr process is intended to make it as simple and satisfactory to buy a building as it is to purchase any other high-value, warranted manufactured product.

To assist Clients in getting the best results from the IDCsr system, they need to appoint an experienced CTM to advise and assist the Client Project Sponsor and Client team. The CTM's key role is to guide the Client team in establishing their fundamental needs, developing and testing the business case to support them and from that preparing the Project Definition. The Project Definition must describe precisely and comprehensively what the Client really needs and wants from the project, together with a realistic and fundable budget. The CTM then goes on to become the Client's interface with the IDCC during the concept, design and delivery stages of the project.

IDCsr is designed to be used by experienced construction professionals, familiar and proficient with traditional design and construction system best practice, who wish to work with their clients in a totally positive, integrated business environment.

By embracing complete, unambiguous integration of the entire process and management structure, IDCsr teams working constructively with their Client teams will be able to create well-designed, well-constructed and fully warranted products, delivered by the agreed handover date, without fuss and without fail. This Code of Practice is intended to assist like-minded clients and construction professionals to do just that, replicating the times when builders were architects and architects were builders – now working together again as constructors.

Colin Harding

Background

The late Victorian and Edwardian era preceding the First World War was undoubtedly the golden age of traditional Design and Build. Then, architects provided total single point responsibility, while representing the client, by accepting full responsibility for their design, as well as for the quality and workmanship of the finished product.

The professional master builders of the time, their general foremen and highly skilled craftsmen, like architects, had a total understanding of good design and traditional best practice building construction methods. They trained and directly employed craftsmen in all trades, including, at the end of the 19th century, those in the emerging technologies of electrical and heating engineering.

There were no formal partnering contracts or middlemen, just a basic fixed price order or, in the case of private dwellings, a sale contract with the reputation of the builder, as well as the architect at stake. Design liability and defects were not a serious issue because designs were based on well-tested empirical principles. More importantly, the design and construction team, who invariably worked together regularly, guarded their reputations jealously. If a problem was reported, it was investigated and attended to promptly without fuss or rancour. The whole system relied on mutual trust and respect between clients, architects and builders working together, underpinned by simple, straightforward legal agreements.

The industry that re-grouped after the First World War in the 1920s would be fundamentally changed as the process and then the industry gradually started to fragment. The post-war emergence of the steel frame and *in situ* reinforced concrete as 'the modern' standard construction systems meant that architects could now design buildings of any shape or size without the restrictions imposed by the traditional structural materials with their old empirical rules. This led to the growth of 'structural engineering' practices that took over responsibility for an important part of the building's design from the architects. It also began to erode the role of the general foreman (site manager) who had traditionally contributed technical expertise across the entire range of craft skills.

Independent quantity surveying practices started to emerge, transferring effective control of a project's cost to an independent third party. As the number of independent consultants involved in the design and supervision of construction continued to grow, so did the number of misunderstandings, errors and consequent conflicts.

By the end of the Second World War, the problems created by the fragmentation of the construction industry were recognised by Government. The Banwell Report (1964) on 'The Placing and Management of Contracts in the Building and Civil Engineering Industry' first made the now familiar recommendations on collaboration between designers and contractors, but in practice, it had little impact. The steady fragmentation of the design process continued through the 20th century with the gradual growth of independent design

consultancies such as fire engineering, acoustics, interior design, landscaping, planning, building control and the whole range of sustainability, 'eco' and other environment-related consultants. Architects passed down much of their design responsibility to these consultants. More seriously, as design management developed, responsibility for more and more sections of a project's design was being transferred by architects to principal contractors through nominated and named sub-contractors and suppliers.

Consequently, conflict and litigation, particularly over design liability versus workmanship and 'fitness for purpose', were steadily increasing. Construction law emerged as a separate recognised discipline in 1983, with the establishment of the Society of Construction Law.

Following the United Kingdom's 1991/1992 recession, Sir Michael Latham was appointed to carry out a joint 'Government/Industry Review of Procurement and Contractual Arrangements in the UK Construction Industry', leading to the publication in 1994 of 'Constructing the Team'. Its principal recommendation of 'partnering' between client, designer and contractor was soon forgotten and in hindsight, somewhat idealistic. Nevertheless, the Latham review raised awareness that alternatives to the traditional fragmented procurement and management systems were available, so that the use of Design and Build forms started to increase and continued to grow in the private sector through the 1990s and 2000s. During the same period, the amendment and customisation of the old standard contract forms became commonplace, and a growing range of alternative procurement systems with their own contracts emerged.

During the Channel Tunnel construction project in 1988–1994, the analysis by the DETR of the construction of two identical office buildings at each side of the Channel designed by the same UK architects demonstrated that the fragmentation of design and construction of the UK contractual system contributed significantly towards excessive waste and low profitability of the system in the United Kingdom, in particular that the UK side employed twice the number of management personnel on their project than the French. (Ref 1)

In 1997, Sir John Egan was appointed to carry out yet another review of the construction industry's management systems. From his earlier experience of modernising the failing British car industry, Egan's principle recommendations set out in his report 'Rethinking Construction' (1998) were to apply Lean Management techniques to the construction process, which would streamline the management structure of the industry. Sir John envisaged that the consequently lean, totally integrated design, production and supply chain management structure would improve efficiency, quality and reliability, thereby reducing overall cost to the client, while improving margins for the supply chain. From his experience, he recognised that higher profit margins created investment, training and innovation, leading to lower costs and improved quality.

However, Lean Management techniques were not applied effectively, and 'integration' was softened to 'partnering', which was specifically restricted to the consultants and largest contractors of Virtual Construction. Risk avoidance led to basic risk dumping to the trade contractors and sub-contractors, rather than lean thinking leading to system improvement, and so improved productivity. In some cases, responsibility for the design of most structural elements, including foundations, structural frame, floors, roofs and cladding started to be transferred at tender stage to the trade contractors by designating them as 'contractor designed'.

The most significant result from 'Rethinking Construction' was the creation of separate frameworks for larger contractors, architects, cost consultants, engineers and specialist service providers, effectively creating an oligopoly for the most attractive public sector work, pushing risk down to the smaller contractors, specialists and sub-contractors and subjecting them to (the Treasury's description) 'rigorous competition', reminiscent of former adversarial malpractices of previous decades.

The establishment of these public sector frameworks marked the final division of the construction industry into two distinct, highly fragmented parts as the following:

1. Virtual Construction, consisting of the fee-generating design and supervisory consultants with the largest contractors and service providers.
2. The much larger yet subservient Real Construction, the contractors, sub-contractors and specialists who actually do the real building work on site.

The Virtual versus Real Construction dichotomy exacerbated the fundamental flaw of the ageing multi-responsibility design and construction management systems – the contractual separation of design from pre- and on-site construction. This is the division that has created the construction industry's 'Management Equation from Hell,' where the principal contractors who sign the contract with the client have no authority over the design, specification or value of their own products, yet bear total responsibility for those product's quality and performance.

That same fragmentation spurred a parallel proliferation of increasingly complex contract forms, habitually amended by clients and funders' lawyers. Ironically, some of the most complex and confusing contracts are those designed to promote partnering and collaboration, including the legal protocol that comes with the otherwise essential modern design tool of BIM. Adversarial drafting leads to adversarial management practices (Ref 2).

A leading UK construction barrister wrote in April 2013 – "Half the business of buildings is about building the blessed thing. The other half is about the bumf that I make a living from and half our industry loves too – it's the contractual playground" (Ref 3). This 'contractual playground', together with the over-manning and consequent duplication of roles, creates the inefficiencies and conflicts that make the United Kingdom one of the most expensive countries in which to build.

The only way to prevent even further growth of this debilitating 'great legal game' is to re-integrate the two sides of the industry – Real and Virtual Construction – so that IDCsr-integrated single legal entities become solely responsible direct to the client for the complete process, from concept and design through delivery and after care, as set out in this Code of Practice.

References: Integrate to Innovate: Colin Harding: Construction Research and Innovation (CRI) Vol 1 Issue 2: 2010: Single Responsibility Integrated Design and Construction: A New Model for Improved Client Value: Colin Harding,; CRI Sept 2011: Ref 1 Biologically Better: Colin Harding: Building 28.3 02: Ref 2: Time to abandon the contractual status quo : Colin Harding, Building 16.7.93: Ref 3: Handy tips on DIY: Tony Bingham: Building 12.4.13