	PRACTICE NOTE NO: 13	Version 1	Amended March 2001	Page 1 of 6
	Copyright © ACSE 2011			
	PRECAST CONCRETE ELEMENT DESIGN RESPONSIBILITIES AND CONTRACTUAL ARRANGEMENTS			

Scope

This Practice Note is intended to identify responsibilities and contractual arrangements for precast elements used in buildings. Such precast concrete elements would include

- structural elements
- precast beams and girders
- precast columns piles
- load-bearing panels (eg. tilt-up panels)
- cladding elements which do not carry vertical loads.

Division of Responsibility

The division of responsibility between all parties involved in the design, manufacture, delivery and installation of precast concrete elements in buildings or structures should be clearly understood and should be fully expressed in the professional engagement and contractual documentation for each particular project. Responsibilities in the design and manufacturing stages are discussed subsequently.

Parties Involved

The parties involved include


- Principal Contractor or Contractor
- Manufacturer or Sub-Contractor
- Structural Engineer
- Architect
- Façade Engineer
- Designer who may be the Architect or the Structural Engineer or the Façade Engineer
- Proprietor or Client

Contractual Alternatives

Responsibility to the Proprietor for the design may rest entirely with the Designer when the work is fully detailed and specified. Alternatively, it may be shared between the Designer and the Manufacturer, as agreed by the Contractor, when some aspects of the design are specified by reference to performance standards or where a Manufacturer's standard product is used. Any such design responsibility vested with the Manufacturer should be clearly defined in the contractual documents. A number of contractual arrangements are discussed subsequently.

Disclaimer:

The ACSE is an association formed to provide a forum for the exchange of information between its members and others. Since the information contained herein is intended for general guidance only, and in no way replaces the services of professional consulting engineers on particular projects, no legal liability for negligence or otherwise can be accepted by the Association for the information contained in this Practice Note.

	PRACTICE NOTE NO: 13	Version 1	Amended March 2001	Page 2 of 6
	Copyright © ACSE 2011			
	PRECAST CONCRETE ELEMENT DESIGN RESPONSIBILITIES AND CONTRACTUAL ARRANGEMENTS			

Industry Involvement

It is recommended that the Designer, ideally at the conceptual stage of the project, should seek the advice of one or more Manufacturers as to the functional, structural and economic feasibility of the proposed design. Acceptance or modification of a Manufacturer's standard product should be treated as the preferred option. Where part of the design responsibility is vested with the Manufacturer, close consultation is necessary to ensure that the statutory requirements are met and to define who is responsible for meeting these requirements.


Design Responsibilities

The following list of design responsibilities should be addressed:

1. Co-ordination of the design of the Precast Concrete Elements with the total design of the building or structure. This includes the determination of the part played by the precast concrete in the support of the structure as a whole. (*Responsibility: Designer*)
2. Preparation of the fully expressed Contract Documents including Drawings, Specification, Forms of Contract and Nominated Subcontractor for Supply. (*Responsibility: Designer*)
3. Specification of any certificates or guarantees required. (*Responsibility: Designer*)
4. Specification of dimensional tolerances for the precast concrete, tolerances for the supporting structure and Contractors' hardware and erection tolerances. (*Responsibility: Designer*)
5. Provision of sample material for the guidance of Tenderers. (*Responsibility: Architect*)
6. Checking and reviewing all Manufacturer's shop drawings and procedures as required in the specification. (*Responsibility: Designer*)
7. Determination of loads and reactions necessary for the design of both reinforcement and connections. This should include loads imposed by live load movements of the building frame if these are to be resisted. (*Responsibility varies according to contractual arrangements*)
8. Design of the supporting structure to withstand any temporary and/or unusual loading conditions that might be encountered as a result of the sequence of erection and/or the sequence of loading the structure. (*Responsibility: Structural Engineer*)

Disclaimer:

The ACSE is an association formed to provide a forum for the exchange of information between its members and others. Since the information contained herein is intended for general guidance only, and in no way replaces the services of professional consulting engineers on particular projects, no legal liability for negligence or otherwise can be accepted by the Association for the information contained in this Practice Note.

	PRACTICE NOTE NO: 13	Version 1	Amended March 2001	Page 3 of 6
	Copyright © ACSE 2011			
	PRECAST CONCRETE ELEMENT DESIGN RESPONSIBILITIES AND CONTRACTUAL ARRANGEMENTS			


9. Design of the supporting structure so that it will carry the load of the precast concrete as well as any superimposed loads without excessive deflection or rotation. (*Responsibility: Structural Engineer*)
10. Design of an acceptable method of fixing the precast units into the structure. This should include consideration of the space required to achieve adequate concrete cover to reinforcing and/or fixings. (*Responsibility varies according to contractual arrangements*)
11. Design of a method of lifting the units. (*Responsibility varies according to contractual arrangements*)
12. Verification that differences in material properties such as stiffness, thermal expansion, moisture content and porosity will not adversely affect the structure. (*Responsibility: Structural Engineer*)
13. Evaluation of the movements due to thermal expansion and shrinkage and their effect on the requirements for joints, connections, reinforcement as well as their compatibility with adjacent materials. (*Responsibility: Structural Engineer*)
14. Evaluation and selection of materials for durable exterior walls with respect to weathering, corrosive environments, heat transfer, vapour diffusion, moist air penetration and rain intrusion. (*Responsibility: Architect or Façade Engineer*)
15. Evaluation and selection of joint treatment for water tightness of exterior concrete panel systems including compatibility with adjacent materials and proper sealing of windows and other openings. (*Responsibility: Architect*)
16. Selection of surface finishes, recognising the limitations in materials and production in regard to uniform colour, texture and durability, especially the limitations inherent in natural materials. (*Responsibility: Architect*)
17. Selection of interior finishes, defining the area of exposure and the interior appearance for occupancy requirements, recognising the material and production limitations. (*Responsibility: Architect*)
18. Determining the fire resistance level, thermal conductivity and sound transmission class required by statutory authorities or others. (*Responsibility: Architect*)

Manufacturing Responsibilities

The responsibilities of the Manufacturer should include:

Disclaimer:

The ACSE is an association formed to provide a forum for the exchange of information between its members and others. Since the information contained herein is intended for general guidance only, and in no way replaces the services of professional consulting engineers on particular projects, no legal liability for negligence or otherwise can be accepted by the Association for the information contained in this Practice Note.

	PRACTICE NOTE NO: 13	Version 1	Amended March 2001	Page 4 of 6
	Copyright © ACSE 2011			
	PRECAST CONCRETE ELEMENT DESIGN RESPONSIBILITIES AND CONTRACTUAL ARRANGEMENTS			

1. A review of the design of the precast concrete elements for feasibility with respect to finishes, connection, handling stresses, material durability, joint treatment and tolerances for both manufacture and installation.
2. Preparation of detailed shop drawings.
3. Reporting any discrepancies and omission to the Designer.
4. Analysis of precast elements during handling to include lifting or temporary loads imposed on them prior to final incorporation into the building or structure.
5. Provide additional reinforcement or bracing as required for the manufacturer's method of casting and handling the units. Provision of any construction loads which are in excess of stated design requirements and which may occur after installation of the units should not be the responsibility of the Manufacturer.
6. The provision of samples with tenders or as requested following tendering.
7. The provision of prototypes if specified.
8. Manufacturing of the precast concrete elements in accordance with the drawings and specifications.

Contractual Arrangements

The contractual arrangements will be made to suit the circumstances of each project. The alternative forms of arrangement are as follows. Arrangement A has been the most commonly used in the past but Arrangement C is now also common.

Arrangement A – Specific Documentation


The Designer prepares tender documents with all aspects of the precast elements fully detailed and specified, including reinforcement and dimensions.

The Manufacturer may suggest modifications that in his experience would improve the economic, structural or other aspect of the design of the precast elements. The Manufacturer should identify such modifications and show clearly what is included in his tender. The Designer should ensure that in accepting a tender it is clear whether or not any suggested modifications have been adopted. After acceptance of his tender the Manufacturer should submit shop drawings for review by the Designer to ensure that the design intent has been met and for the approval of the Contractor.

A Designer using this Arrangement and providing complete reinforcement and connection details for the precast elements should be receptive to suggestions for reasonable modifications. His detailed design establishes parameters for what he may accept as modifications both structurally

Disclaimer:

The ACSE is an association formed to provide a forum for the exchange of information between its members and others. Since the information contained herein is intended for general guidance only, and in no way replaces the services of professional consulting engineers on particular projects, no legal liability for negligence or otherwise can be accepted by the Association for the information contained in this Practice Note.

	PRACTICE NOTE NO: 13	Version 1	Amended March 2001	Page 5 of 6
	Copyright © ACSE 2011			
	PRECAST CONCRETE ELEMENT DESIGN RESPONSIBILITIES AND CONTRACTUAL ARRANGEMENTS			

and functionally. Alternative proposals from a Manufacturer should match the required quality and remain within the parameters established for the project. It is particularly advisable to give favourable consideration to such proposals if the modifications are suggested so as to conform to the Manufacturer's normal and proven procedures.

Where certification is required by Local Councils or other authorities as work is completed the Designer is responsible to supply these for the Contractor under this Alternative. The work which has been completed by the Precast Manufacturer would also be included in this certification unless specified otherwise in the contract documents.

Arrangement B – Specific and Performance Documentation

The Designer prepares tender documents for the precast elements with all aspects of the design, except for the structural aspects, fully detailed and specified. The structural aspects of the design of the precast elements are only specified in performance terms which include limiting combinations of loads together with their points of application. This information should be supplied in such a way that the precast elements can be designed without reference to the behaviour of other parts of the structure. The division of responsibility for the design must be clearly stated by the Designer in the tender documents.

The Manufacturer completes the design in accordance with the specified structural performance standards and submits with his tender, drawings and design information including structural calculations. After acceptance of his tender the Manufacturer submits shop drawings for review by the Designer and for the approval of the Contractor.

The Manufacturer accepts responsibility for complying with the specified structural performance and accordingly must provide certification for the authorities/local councils in respect of the precast elements and their fixings.

Experience has shown that divided design responsibilities can create contractual problems. It is essential that the allocation of design responsibility is understood and clearly expressed in the tender documents.

This arrangement is usual where the Architect does not engage a Design Engineer to assist in the design.


Arrangement C – Performance Documentation

The Designer prepares tender documents incorporating outline details only and specifies all aspects of the design in performance standard terms.

The Manufacturer completes the design in accordance with the specified performance standards and submits with his tender, drawings and design information including structural calculations.

Disclaimer:

The ACSE is an association formed to provide a forum for the exchange of information between its members and others. Since the information contained herein is intended for general guidance only, and in no way replaces the services of professional consulting engineers on particular projects, no legal liability for negligence or otherwise can be accepted by the Association for the information contained in this Practice Note.

	PRACTICE NOTE NO: 13	Version 1	Amended March 2001	Page 6 of 6
	Copyright © ACSE 2011			
	PRECAST CONCRETE ELEMENT DESIGN RESPONSIBILITIES AND CONTRACTUAL ARRANGEMENTS			

The Manufacturer accepts responsibility for complying with the specified performance standards. After acceptance of his tender the Manufacturer submits shop drawings for review by the designer and for the approval of the Contractor. The Manufacturer provides certification for the authorities/local councils in respect of the precast elements and their fixings.

This arrangement could be used where a Manufacturer's standard product is used.

Performance Specification

The preparation of performance specifications for precast concrete requires skill and experience to clearly define the end result and to ensure durability, economy and optimum quality. The use of performance specifications by Architects who do not possess such skill and experience or who are not assisted by an experienced Design Engineer is not recommended.

Disclaimer:

The ACSE is an association formed to provide a forum for the exchange of information between its members and others. Since the information contained herein is intended for general guidance only, and in no way replaces the services of professional consulting engineers on particular projects, no legal liability for negligence or otherwise can be accepted by the Association for the information contained in this Practice Note.