

# **Pre-engineered Building Erector**

Provincial Occupational Analysis      2009

## **ACKNOWLEDGEMENTS**

Apprenticeship Manitoba wishes to express sincere appreciation for the contribution of the Pre-engineered Building Erectors who contributed, directly or indirectly, to this publication.

Special acknowledgement is extended to the Pre-engineered Building Erector Industry Working Group (IWG) composed of:

Pat Traill  
Len Funk  
Ken Brennan  
Peter Enns

Pre-Con Builders  
Pre-Con Builders  
North Perimeter Construction  
Pro Steel Ltd.

Facilitator:  
Recorder:

Gabriel Chung  
Nancy Eller

## **OTHER RELATED OCCUPATIONAL TITLES**

In developing this analysis, the Industry Working Group (IWG) consulted National Occupational Analyses prepared by Human Resources Skills Development Canada from the following:

Ironworker (Generalist) National Occupational Analysis	2006
Sheet Metal Worker National Occupational Analysis	2006
Carpenter National Occupational Analysis	2005

## TABLE OF CONTENTS

		Page
ACKNOWLEDGEMENTS		ii
OTHER RELATED OCCUPATIONAL TITLES		iii
<b>Guide to Analysis</b>		
DEVELOPMENT OF ANALYSIS		vi
STRUCTURE OF ANALYSIS		vi
VALIDATION METHOD		vii
SCOPE OF THE OCCUPATION		viii
OCCUPATIONAL OBSERVATIONS		ix
<b>Analysis</b>		
<b>BLOCK A</b>	<b>Occupational Skills</b>	1
	Task 1      Selects rigging and hoisting equipment.	1
	Task 2      Uses tools and equipment.	4
	Task 3      Organizes work.	8
	Task 4      Maintains Pre-engineered buildings.	11
<b>BLOCK B</b>	<b>Pre-erection</b>	13
	Task 5      Performs site inspections.	13
	Task 6      Unloads building components.	14
<b>BLOCK C</b>	<b>Structure Erection</b>	15
	Task 7      Pre-assembles components.	15
	Task 8      Erects primary structures.	16
	Task 9      Erects secondary structures.	17
<b>BLOCK D</b>	<b>Roofing and Cladding</b>	20
	Task 10     Installs cladding and insulates wall systems.	20
	Task 11     Installs cladding and insulates roof systems.	22
	Task 12     Installs flashing, gutters and trim.	24
<b>Appendices</b>		
Appendix "A"	Tools and Equipment	27
Appendix "B"	Glossary	30
Appendix "C"	Pie Chart	31
Appendix "D"	DACUM Chart – Task Profile Chart	32

**GUIDE TO ANALYSIS**

## **DEVELOPMENT OF ANALYSIS**

A draft analysis is developed by a knowledgeable consultant who, with the assistance of a committee of experts in the field, identifies all the tasks performed in the occupation.

## **STRUCTURE OF ANALYSIS**

To facilitate the understanding of the nature of the occupation, the work performed is divided into the following divisions:

- A. BLOCK** - is the largest division within the analysis and reflects a distinct operation relevant to the occupation.
- B. TASK** - is the distinct activity that, combined with others, makes up the logical and necessary steps the worker is required to perform to complete a specific assignment within a "BLOCK."
- C. SUB-TASK** - is the smallest division into which it is practical to subdivide any work activity and, combined with others, fully describes all duties constituting a "TASK."

### **Supporting Knowledge and Abilities**

The element of skill and knowledge that an individual must acquire to adequately perform the task is identified under this heading.

### **Trends**

Any shifts or changes in technology or the working environment which affect the block are identified under this heading.

## **VALIDATION METHOD**

Several Pre-engineered Building Erectors validated the sub-tasks and applied percentage ratings to blocks and tasks. This method for the validation assisted in the completion of the time weighting section of the position description.

### **DEFINITIONS**

- YES:** You perform this sub-task.
- NO:** You do **not** perform this sub-task.
- BLOCK %:** the percentage of time you spend on a monthly basis performing this component.
- TASK %:** the percentage of time you spend on a monthly basis performing this task.

### **TOOLS AND EQUIPMENT (APPENDIX "A")**

### **GLOSSARY (APPENDIX "B")**

### **PIE CHART (APPENDIX "C")**

The graph depicts the percentages the Committee assigned to blocks in the analysis during validation.

### **DACUM CHART (APPENDIX "D")**

The listing of all the blocks, tasks and sub-tasks as established by the Industry Working Group and validated by several Pre-engineered Building Erectors.

## SCOPE OF THE OCCUPATION

This occupational analysis identifies tasks performed by qualified Pre-engineered Building Erectors across Manitoba. Pre-engineered Building Erectors fabricate, construct and join scaffolding, and erect Pre-engineered buildings. They are limited to work on one-storey, steel framed metal buildings generally referred to as Pre-engineered buildings. Besides erecting Pre-engineered buildings, they sometimes perform reconstructive work on and additions to existing structures.

In general, Pre-engineered Building Erectors perform the following main duties:

- Read blueprints and specifications to lay out the work
- Unload and stack steel units so each piece can be hoisted as needed
- Erect and install scaffolding
- Use rigging equipment to move materials, including attaching cables from a crane and directing crane operators with hand signals or radios
- Attach cables from a crane and direct crane operators with hand signals or radios
- Erect steel units and pre-fabricated metal structures, align holes and insert bolts
- Align/square the structural steel
- Sheet/insulate wall and roof systems

Most Pre-engineered Building Erectors are employed by a variety of construction contractors. Very few Pre-engineered Building Erectors are self-employed. In the construction industry, Pre-engineered Building Erectors work on a project-to-project basis and may be required to frequently travel long distances from job to job.

To be successful in the trade, Pre-engineered Building Erectors need a mechanical ability, ability to work at heights, and an ability to use good judgment with regards to safety equipment and considerations. The ability to work outdoors and in teams or crews, as well as the capability to travel and work with different crews is important. Experienced Pre-engineered Building Erectors may advance to supervisory positions such as foreman and construction superintendent.



## OCCUPATIONAL OBSERVATIONS

Technology continues to contribute to many changes in equipment design and construction materials. These innovations require constantly changing methods and techniques governed by appropriate attitudes towards the current high standards for fabrication, erection and installation of components. Pre-engineered Building Erectors are therefore finding it increasingly necessary to keeping current with these changes.

With continued economic growth, companies in expansion mode continue to depend on more effective and efficient means of meeting their customers' needs. New and recognizable buildings need to be erected in new subdivisions or towns as soon as it is feasible to do so. The continued improvements in product design and development simply means that an erector in this trade must keep current with both changes in safety standards as well as procedures to erect such buildings.

The work of a Pre-engineered Building Erector, by its nature, possesses inherent hazards. Safe work procedures, best practices and job hazard analysis assist in controlling or eliminating hazards. Errors in judgment or in practical application of trade knowledge can be costly; therefore, workers must maintain constant attention to the application of safety and accident prevention at all times.

## **ANALYSIS**

## BLOCK A

### Occupational Skills

*Trends: There have been significant changes in the engineering and technology of Pre-engineered building erectors tools and equipment such as laser-based survey equipment and other electronic measuring instruments. Aerial work platforms are used more often than traditional scaffolding. In addition to more comprehensive regulations in regard to the use of heavy mobile equipment, the industry has seen a greater emphasis on safety training for safer working conditions. This has meant increased safety enforcement and reporting requirements to safety officers or designates.*

**Task 1 Selects rigging and hoisting equipment.**

#### Sub-task

**1.01 Uses hoisting equipment. Supporting Knowledge and Abilities**

1.01.01	knowledge of provincial and applicable regulations and certification requirements
1.01.02	knowledge of types of hoisting equipment such as come-alongs, grip hoist, chain block hoists and zoom booms
1.01.03	knowledge of hoisting procedures
1.01.04	knowledge of placement and attachment location
1.01.05	knowledge of hoisting specifications
1.01.06	knowledge of policies and procedures
1.01.07	ability to select hoisting equipment
1.01.08	ability to select lifting procedures
1.01.09	ability to use and tie knots, bends and hitches
1.01.10	ability to follow manufacturers' specifications

**Sub-task****1.02 Uses rigging equipment.****Supporting Knowledge and Abilities**

- 1.02.01 knowledge of types of lifting equipment such as hydraulic jacks, fork lifts, air pallets, pallet jacks, rollers and extended booms
- 1.02.02 knowledge of the capacity of lifting equipment
- 1.02.03 knowledge of basic geometry
- 1.02.04 knowledge of weights and measures
- 1.02.05 knowledge of types of rigging equipment
- 1.02.06 knowledge of manufacturers' specifications
- 1.02.07 knowledge of policies and procedures
- 1.02.08 knowledge of tools and materials
- 1.02.09 ability to calculate weights of loads
- 1.02.10 ability to select rigging equipment
- 1.02.11 ability to calculate choker tension based on choker angle and load
- 1.02.12 ability to identify defects
- 1.02.13 ability to report defects
- 1.02.14 ability to perform maintenance procedures
- 1.02.15 ability to store rigging equipment

**Sub-task****1.03 Uses hand signals.****Supporting Knowledge and Abilities**

- 1.03.01 knowledge of types of signals
- 1.03.02 knowledge of hand signals

- 1.03.03 knowledge of signal terminology
- 1.03.04 ability to select types of signals
- 1.03.05 ability to interpret signals

**Sub-task**

**1.04 Works with cranes.**

**Supporting Knowledge and Abilities**

- 1.04.01 knowledge of types of hazards such as overhead power lines, underground services, other workers and obstructions to swing radius
- 1.04.02 knowledge of crane types
- 1.04.03 knowledge of crane capacity
- 1.04.04 knowledge of crane limitations due to inclement weather
- 1.04.05 knowledge of composition of base such as soil, concrete and steel
- 1.04.06 knowledge of crane components such as boom sections, counterweights and jibs
- 1.04.07 knowledge of crane signals
- 1.04.08 knowledge of rigging practices
- 1.04.09 ability to identify potential hazards
- 1.04.10 ability to calculate the available headroom
- 1.04.11 ability to ensure ground is stable and level

**Task 2 Uses tools and equipment.**

**Sub-task**

**2.01 Uses hand tools.**

**Supporting Knowledge and Abilities**

- 2.01.01 knowledge of types and uses of hand tools
- 2.01.02 knowledge of hand tool safety
- 2.01.03 knowledge of manufacturers' specifications on the use and care of hand tools
- 2.01.04 knowledge of types of measuring equipment
- 2.01.05 ability to select hand tools required for a task
- 2.01.06 ability to identify damaged, worn or otherwise unsafe hand tools
- 2.01.07 ability to clean and store hand tools
- 2.01.08 ability to maintain hand tools

**Sub-task**

**2.02 Uses power tools (electric and gas).**

**Supporting Knowledge and Abilities**

- 2.02.01 knowledge of types and uses of power tools such as pneumatic, electric, gas powered and hydraulic
- 2.02.02 knowledge of power tool components
- 2.02.03 knowledge of operating procedures for power tools
- 2.02.04 knowledge of power tool safety
- 2.02.05 knowledge of manufacturers' recommended uses, limitations and maintenance of power tools
- 2.02.06 ability to select power tools required for a task
- 2.02.07 ability to identify damaged, worn or otherwise unsafe power tools
- 2.02.08 ability to clean and store power tools

2.02.09 ability to maintain power tools

**Sub-task**

**2.03 Uses aerial work platforms.**

**Supporting Knowledge and Abilities**

- 2.03.01 knowledge of types and uses of aerial work platforms
- 2.03.02 knowledge of aerial work platform safety
- 2.03.03 knowledge of aerial work platform regulations and certification requirements
- 2.03.04 knowledge of aerial work platform components and accessories
- 2.03.05 knowledge of operating procedures of aerial work platforms
- 2.03.06 knowledge of manufacturers' specifications for use of aerial work platforms
- 2.03.07 ability to identify damaged, worn or otherwise unsafe aerial work platforms and equipment
- 2.03.08 ability to position aerial work platforms
- 2.03.09 ability to store aerial work platforms

**Sub-task**

**2.04 Uses survey equipment.**

**Supporting Knowledge and Abilities**

- 3.01.01 knowledge of types of layout instruments such as theodolite, transit and laser level
- 3.01.02 knowledge of measurement techniques
- 3.01.03 knowledge of marking techniques
- 3.01.04 ability to select equipment for a task
- 3.01.05 ability to calculate angles and distances

- 3.01.06 ability to transfer blueprint information to site
- 3.01.07 ability to set up equipment
- 3.01.08 ability to store surveying equipment

**Sub-task**

**2.05 Uses scaffolding and ladders.**

**Supporting Knowledge and Abilities**

- 3.02.01 knowledge of types and uses of scaffolding and ladders
- 3.02.02 knowledge of safe operating procedures for scaffolding and ladders
- 3.02.03 knowledge of regulations pertaining to scaffolding
- 3.02.04 knowledge of manufacturers' specifications for use and care of scaffolding and ladders
- 3.02.05 ability to position ladders
- 3.02.06 ability to secure ladders
- 3.02.07 ability to position and erect scaffolding and install planking, guardrails and toe plates
- 3.02.08 ability to secure scaffolding, planking, guardrails, toe plates and related components
- 3.02.09 ability to dismantle and store ladders
- 3.02.10 ability to dismantle and store scaffolding
- 3.02.11 ability to identify worn, damaged or otherwise unsafe ladders
- 3.02.12 ability to identify worn, damaged or otherwise unsafe scaffolding and planking



**Sub-task**

**2.06 Uses oxy-fuel cutting equipment.**

**Supporting Knowledge and Abilities**

- 3.03.01 knowledge of cutting processes
- 3.03.02 knowledge of cutting equipment
- 3.03.03 knowledge of cutting consumables
- 3.03.04 ability to set up equipment
- 3.03.05 ability to inspect equipment
- 3.03.06 ability to adjust cutting parameters
- 3.03.07 ability to recognize cutting hazards
- 3.03.08 ability to identify damaged, worn or otherwise unsafe cutting equipment
- 3.03.09 ability to store cutting equipment and consumables

**Sub-task**

**2.07 Uses personal protective equipment (PPE).**

**Supporting Knowledge and Abilities**

- 3.04.01 knowledge of types and uses of PPE such as hard hats, safety glasses, hearing protection, safety footwear and fall arrest equipment
- 3.04.02 knowledge of PPE safety
- 3.04.03 knowledge of manufacturers' recommended uses, limitations and maintenance of PPE
- 3.04.04 knowledge of workplace rules and regulations
- 3.04.05 ability to select PPE for conditions encountered
- 3.04.06 ability to use fall arrest equipment such as harnesses, safety belts and lines
- 3.04.07 ability to identify damaged, worn or otherwise unsafe PPE
- 3.04.08 ability to store PPE

**Task 3 Organizes work.**

**Sub-task**

**3.01 Maintains safe work environment.**

**Supporting Knowledge and Abilities**

- 3.01.01 knowledge of safety regulations
- 3.01.02 knowledge of Workplace Hazardous Materials Information System (WHMIS)
- 3.01.03 knowledge of applications of safety equipment such as fall arrest, fall restraint and work positioning

- 3.01.04 knowledge of safe work practices and limitations
- 3.01.05 ability to apply safety standards applicable to workplace
- 3.01.06 ability to perform a hazard assessment
- 3.01.07 ability to collect Material Safety Data Sheets (MSDS)
- 3.01.08 ability to install safety equipment such as guard rails, static lines, lifelines, screens, temporary flooring, warning signs and barriers
- 3.01.09 ability to maintain good housekeeping
- 3.01.10 ability to comply with regulations and company policies and procedures

**Sub-task**

**3.02 Communicates with others.**

**Supporting Knowledge and Abilities**

- 3.02.01 knowledge of interpersonal communication techniques
- 3.02.02 knowledge of trade vocabulary
- 3.02.03 knowledge of barriers to communication
- 3.02.04 ability to actively listen
- 3.02.05 ability to check to confirm understanding

**Sub-task**

**3.03 Coordinates with other trades.**

**Supporting Knowledge and Abilities**

- 3.03.01 knowledge of report formats
- 3.03.02 ability to actively listen

- 3.03.03 ability to translate technical terms into layperson language
- 3.03.04 ability to address others' concerns
- 3.03.05 ability to write reports in prescribed formats
- 3.03.06 ability to check to confirm understanding
- 3.03.07 ability to participate and/or conduct 'tool box' meetings

**Sub-task**

**3.04 Communicates electronically.**

**Supporting Knowledge and Abilities**

- 3.04.01 knowledge of types of electronic communication devices such as cellular telephones, two-way radios and laptop computers
- 3.04.02 knowledge of communication protocols and company reporting policies
- 3.04.03 ability to send, receive and retrieve information from computers

**Sub-task**

**3.05 Organizes materials and supplies.**

**Supporting Knowledge and Abilities**

- 3.05.01 knowledge of estimating amount of insulation material for wall and roof systems
- 3.05.02 knowledge of erection sequence
- 3.05.03 knowledge of placing and assembly
- 3.05.04 knowledge of equipment capabilities and limitations
- 3.05.05 ability to schedule material and supplies required for job

- 3.05.06 ability to place and sort materials and supplies
- 3.05.07 ability to secure equipment and materials
- 3.05.08 ability to order insulation required

**Sub-task**

**3.06 Interprets drawings and specifications.**

**Supporting Knowledge and Abilities**

- 3.06.01 knowledge of types of drawings such as structural erection, architectural, and shop drawings
- 3.06.02 knowledge of abbreviations and technical vocabulary
- 3.06.03 knowledge of drafting symbols
- 3.06.04 ability to interpret drawings and specifications
- 3.06.05 ability to correlate types of drawings such as structural drawings, architectural drawings, engineering drawings, detail drawings and erection drawings
- 3.06.06 ability to distinguish types of views
- 3.06.07 ability to relate drawings to worksite
- 3.06.08 ability to determine the building component weights

**Task 4 Maintains Pre-engineered Buildings.**

**Sub-task**

**4.01 Repairs damaged components.**

**Supporting Knowledge and Abilities**

- 4.01.01 knowledge of damaged components

- 4.01.02 knowledge of repair techniques
- 4.01.03 knowledge of building systems
- 4.01.04 ability to conduct a visual inspection
- 4.01.05 ability to determine cause of fault
- 4.01.06 ability to remove existing damaged components
- 4.01.07 ability to select replacement components
- 4.01.08 ability to adapt available components if product is obsolete

**Sub-task**

**4.02 Strengthens existing structures.**

**Supporting Knowledge and Abilities**

- 4.02.01 knowledge of damaged components
- 4.02.02 knowledge of repair techniques
- 4.02.03 knowledge of building systems
- 4.02.04 ability to select replacement components
- 4.02.05 ability to interpret engineers' drawings

## BLOCK B

### Pre-erection

*Trends: The industry has seen an improvement in site conditions, especially in terms of improved safety. During the pre-erection process, scheduling has taken a greater importance.*

**Task 5 Performs site inspections.**

#### Sub-task

**5.01 Ensures access to site and building. Supporting Knowledge and Abilities**

- 5.01.01 knowledge of ground conditions
- 5.01.02 knowledge of hoisting equipment and required clearances
- 5.01.03 knowledge of erection procedures
- 5.01.04 ability to recognize hazards and obstructions
- 5.01.05 ability to control hazards
- 5.01.06 ability to improvise to suit site conditions

#### Sub-task

**5.02 Checks layout/elevation of foundation. Supporting Knowledge and Abilities**

- 5.02.01 knowledge of drawings
- 5.02.02 ability to interpret drawings
- 5.02.03 ability to use measuring devices and layout tools
- 5.02.04 ability to apply marking and layout techniques including anchor bolts
- 5.02.05 ability to visualize finished product

5.02.06 ability to transfer drawing information to accommodate site conditions

5.02.07 ability to check building elevations

**Task 6 Unloads building components.**

**Sub-task**

**6.01 Checks shipment/inventory.**

**Supporting Knowledge and Abilities**

6.01.01 knowledge of building components

6.01.02 knowledge of shipping documentation

6.01.03 ability to reconcile load with shipping documents

6.01.04 ability to submit a damage report

6.01.05 ability to determine the amount of components

6.01.06 ability to replace damaged components

**Sub-task**

**6.02 Sorts building components.**

**Supporting Knowledge and Abilities**

5.02.01 knowledge of identification of building components

5.02.02 knowledge of erection procedures

5.02.03 ability to place and sort materials and supplies



## BLOCK C

### Structure Erection

*Trends: The occupation has seen steady advancements in the development of safer work environments. Together with the improvements in tools and equipment used such as fall protection, the greater safety enforcement and reporting requirements have contributed to safer working conditions.*

#### Task 7 Pre-assembles components.

##### Sub-task

#### 7.01 Prepares columns.

##### Supporting Knowledge and Abilities

- 7.01.01 knowledge of clips and braces required
- 7.01.02 knowledge of types of columns and their locations
- 7.01.03 knowledge of bolts and pins required
- 7.01.04 knowledge of installation techniques and methods
- 7.01.05 knowledge of types of bolts
- 7.01.06 ability to install clips and flange braces
- 7.01.07 ability determine location of columns
- 7.01.08 ability to connect clips and braces using the correct fasteners

##### Sub-task

#### 7.02 Assembles rafters.

##### Supporting Knowledge and Abilities

- 7.02.01 knowledge of types of structural members
- 7.02.02 knowledge of lifting sequence and hoisting procedures
- 7.02.03 knowledge of bolts
- 7.02.04 ability to bolt the rafters in the correct order

7.02.05 ability to connect rafters using bolts, clips and braces

**Task 8 Erects primary structures.**

**Sub-task**

**8.01 Stands columns.**

**Supporting Knowledge and Abilities**

8.01.01 knowledge of hoisting procedures  
8.01.02 knowledge of placement and attachment location  
8.01.03 knowledge of plumbing procedures  
8.01.04 ability to shim as required

**Sub-task**

**8.02 Erects rafters.**

**Supporting Knowledge and Abilities**

8.02.01 knowledge of hoisting procedures  
8.02.02 knowledge of placement and attachment location  
8.02.03 ability to select lifting procedures

**Sub-task**

**8.03 Torques bolts.**

**Supporting Knowledge and Abilities**

8.03.01 knowledge of types of bolts  
8.03.02 knowledge of torquing procedures  
8.03.03 knowledge of torquing equipment  
8.03.04 ability to locate and torque all bolts

**Task 9        Erects secondary structures.**

**Sub-task**

**9.01    Installs purlins and girts.**

**Supporting Knowledge and Abilities**

- 9.01.01        knowledge of hoisting procedures
- 9.01.02        knowledge of placement and attachment location
- 9.01.03        knowledge of alignment procedures for purlins and girts
- 9.01.04        ability to select lifting procedures

**Sub-task**

**9.02    Installs bracing  
(Temporary and  
Permanent)**

**Supporting Knowledge and Abilities**

- 9.02.01        knowledge of plumbing and alignment techniques and tolerances
- 9.02.02        knowledge of temporary bracing techniques
- 9.02.03        knowledge of bracing procedures
- 9.02.04        knowledge of placement and attachment location of temporary bracing
- 9.02.05        knowledge of supports and bracing
- 9.02.06        ability to attach tools and equipment such as cables, round rods, jacks and temporary bracing
- 9.02.07        ability to set up and use surveying equipment such as levels, plumb bobs, transits and laser levels

**Sub-task**

**9.03 Frames openings.**

**Supporting Knowledge and Abilities**

- 9.03.01 knowledge of types of openings
- 9.03.02 knowledge of framing procedures
- 9.03.03 ability to frame rough openings
- 9.03.04 ability to verify rough openings
- 9.03.05 ability to fasten jambs/frames plumb, level and square

**Sub-task**

**9.04 Installs base angles/channels.**

**Supporting Knowledge and Abilities**

- 9.04.01 knowledge of fasteners
- 9.04.02 knowledge of sealant procedures
- 9.04.03 ability to locate base angle/channel
- 9.04.04 ability to install fastener into foundation

**Sub-task**

**9.05 Installs canopies and facades.**

**Supporting Knowledge and Abilities**

- 9.05.01 knowledge of secondary members
- 9.05.02 knowledge of framing canopies and facades
- 9.05.03 knowledge of placement and attachment location
- 9.05.04 ability to frame canopies and facades

**Sub-task**

**9.06 Installs mezzanines.**

**Supporting Knowledge and Abilities**

- 9.06.01 knowledge of secondary members
- 9.06.02 knowledge of framing mezzanines
- 9.06.03 knowledge of placement and attachment location
- 9.06.04 ability to frame mezzanines

**Sub-task**

**9.07 Installs partition walls.**

**Supporting Knowledge and Abilities**

- 9.07.01 knowledge of secondary members
- 9.07.02 knowledge of framing partition walls
- 9.07.03 knowledge of placement and attachment location
- 9.07.04 ability to frame partition walls

## BLOCK D

### Roofing and Cladding

*Trends: The industry has seen an improvement in site conditions, including the use of fall protection and other safety equipment. In terms of the advances in Pre-engineered building components, the industry has seen the use of improved insulation (higher R-value) in walls and roofing systems that are more thermally efficient. Certain walls make use of mineral wool insulation for enhanced fire resistance. More and more windows being installed are fully-framed with PVC for lower maintenance costs.*

**Task 10 Installs cladding and insulates wall systems.**

#### Sub-task

**10.01 Lays out wall systems.**

#### **Supporting Knowledge and Abilities**

- 10.01.01 knowledge of types of wall systems
- 10.01.02 knowledge of wall materials and characteristics of final appearance of wall
- 10.01.03 ability to check wall for square
- 10.01.04 ability to establish starting point for layout
- 10.01.05 ability to establish reference lines using methods such as snap lines, string lines and lasers
- 10.01.06 ability to minimize waste

#### Sub-task

**10.02 Installs metal building insulation.**

#### **Supporting Knowledge and Abilities**

- 10.02.01 knowledge of types of insulation
- 10.02.02 knowledge of isolation materials such as wood blocks and mineral fibre
- 10.02.03 knowledge of air and vapour barriers
- 10.02.04 knowledge of fasteners

- 10.02.05 knowledge of manufacturers' recommended installation method
- 10.02.06 ability to cut, fit secure and seal materials

**Sub-task**

**10.03 Aligns the girts.**

**Supporting Knowledge and Abilities**

- 10.03.01 knowledge of girt alignment
- 10.03.02 ability to align girts with temporary blocking

**Sub-task**

**10.04 Installs the wall systems.**

**Supporting Knowledge and Abilities**

- 10.04.01 knowledge of types of wall systems
- 10.04.02 knowledge of wall materials and characteristics of final appearance of wall
- 10.04.03 knowledge of fasteners
- 10.04.04 ability to check wall for square
- 10.04.05 ability to establish starting point for layout
- 10.04.06 ability to establish reference lines using methods such as snap lines, string lines and lasers
- 10.04.07 ability to minimize waste
- 10.04.08 ability to cut, fit and secure components

**Sub-task**

**10.05 Installs liner panels.**

**Supporting Knowledge and Abilities**

- 10.05.01 knowledge of types of wall systems
- 10.05.02 knowledge of wall materials and characteristics of final appearance of wall
- 10.05.03 knowledge of fasteners

- 10.05.04 knowledge of framing techniques
- 10.05.05 ability to check wall for square
- 10.05.06 ability to establish starting point for layout
- 10.05.07 ability to establish reference lines using methods such as snap lines, string lines and lasers
- 10.05.08 ability to minimize waste
- 10.05.09 ability to cut, fit and secure components

**Task 11 Installs cladding and insulates roof systems.**

**Sub-task**

**11.01 Lays out roof systems.**

**Supporting Knowledge and Abilities**

- 11.01.01 knowledge of types of roof systems
- 11.01.02 knowledge of roof materials and characteristics of final appearance of roof
- 11.01.03 ability to check roof for square
- 11.01.04 ability to establish starting point for layout
- 11.01.05 ability to establish reference lines using methods such as snap lines, string lines and lasers
- 11.01.06 ability to minimize waste

**Sub-task**

**11.02 Installs insulation and isolation material.**

**Supporting Knowledge and Abilities**

- 11.02.01 knowledge of types of insulation
- 11.02.02 knowledge of isolation materials such as wood blocks and styrofoam
- 11.02.03 knowledge of air and vapour barriers



- 11.02.04 knowledge of fasteners
- 11.02.05 knowledge of manufacturers' recommended installation method
- 11.02.06 ability to cut, fit secure and seal materials

**Sub-task**

**11.03 Installs roof systems.**

**Supporting Knowledge and Abilities**

- 11.03.01 knowledge of types of roof systems such as standing seam, batten, snap lock and screw down
- 11.03.02 knowledge of fasteners such as concealed and exposed clips
- 11.03.03 knowledge of thermal expansion and contraction of material
- 11.03.04 knowledge of the effect of weather conditions on material and installation
- 11.03.05 ability to cut, fit and secure components

**Sub-task**

**11.04 Installs roof curbs.**

**Supporting Knowledge and Abilities**

- 11.04.01 knowledge of types of roof curbs
- 11.04.02 ability to install a roof curb according to the manufacturers' specifications
- 11.04.03 ability to fasten jambs/frames plumb and level

**Sub-task**

**11.05 Applies sealants.**

**Supporting Knowledge and Abilities**

- 11.05.01 knowledge of sealants such as butyl and mastic

- 11.05.02 knowledge of manufacturers' recommendations for application
- 11.05.03 knowledge of locations requiring sealing
- 11.05.04 ability to select sealant for application
- 11.05.05 ability to apply sealant in a consistent manner

**Task 12 Installs flashing, gutters and trim.**

**Sub-task**

**12.01 Installs windows and doors.**

**Supporting Knowledge and Abilities**

- 12.01.01 knowledge of types of windows and doors
- 12.01.02 knowledge of window and door components
- 12.01.03 knowledge of weather protection techniques
- 12.01.04 knowledge of installation procedures for door and window hardware
- 12.01.05 ability to interpret a door and window schedule
- 12.01.06 ability to determine door swing
- 12.01.07 ability to select, place and fasten doors and windows
- 12.01.08 ability to adjust doors and windows

**Sub-task**

**12.02 Installs exterior flashings including eaves and base flashing.**

**Supporting Knowledge and Abilities**

- 12.02.01 knowledge of types of trims, eaves and flashing and related components
- 12.02.02 knowledge of application of sealants

- 12.02.03 ability to select and install eaves and base flashings
- 12.02.04 ability to tape sealant at eaves
- 12.02.05 ability to measure and order custom flashings

**Sub-task**

**12.03 Installs gutters and downspouts.**

**Supporting Knowledge and Abilities**

- 12.03.01 knowledge of types of gutters and downspouts
- 12.03.02 ability to install to manufacturers' specifications
- 12.03.03 ability to field modify components
- 12.03.04 ability to cut, fit and secure components
- 12.03.05 ability to apply sealant

## APPENDICES

# Appendix "A"

## Tools and Equipment

### Hand Tools

adjustable wrench	marking pen
aligning bar (sleever bar)	needle nose pliers
Allen key set	nut drivers
ball peen	pins (drift, bull)
beam clamps	pipe wrench
bolt bag	pliers
bolt cutters	pop riveter
cable cutters	prybar
caulking gun	punch
C-clamp	reamers
centre punch	scratch awl
chalk line	screwdrivers
cold chisel	side/diagonal cutters
combination snip	sledge hammer
combination square	slip joint pliers
combination wrench set	socket set
drill bits	spud wrench
files	tap set
finger clamps	tin snips
flashlight	tool belt
hack saw	tool bucket
hammers	wire brush
knives	

### Measuring and Layout Equipment

bevel squares	squares (framing, combination)
builders level	straight edges
chalk line	string line
laser level	theodolite
laser square	torpedo level
measuring tape	transit
optical levels	tripods
plumb line	vernier
spirit levels	

## **Safety Equipment**

anchor points  
cables  
eye wash facilities  
fire blankets  
fire extinguishers  
first aid equipment  
guard rails

life lines  
perimeter cables  
portable lighting  
ropes (fibre, wire)  
signage  
stanchion posts  
warning tape

## **Personal Protective Equipment**

ear plugs  
face shields  
fall arresters  
full body harness  
gloves  
goggles  
hard hat

insulated gloves  
knee pads  
retractable and non-retractable lanyard  
rope grabs  
safety glasses  
safety vest  
steel toe boots

## **Power Tools and Equipment**

angle drill  
angle grinder  
chop saw  
circular saw  
compressor  
cordless drill  
electric riveter  
extension cord  
gas cut-off saw  
gas deck saw  
generator  
grinder

hammer drill  
impact drill  
impact gun  
mag drill  
nibbler  
power drill  
power shears  
power washer  
reciprocating saw  
riveting gun  
screw gun

## **Scaffolding and Access Equipment**

aerial work platforms	gas powered scissor lifts
aluminium framed platform	ladders
aluminium planks	mechanical scaffolds
boom lifts	ramps
can, 5 gal gasoline	rolling scaffolds
electrical articulated boom lift	sawhorses
electrical scissor lifts	scissor-lift
electrical vertical lifts	stationary scaffolds
end frames	stepladders
extension ladder	swing stages
gas powered articulated boom lift	tube and clamps

## **Rigging Equipment**

beam clamps	mechanical/hydraulic jacks
binders	rope clips
blocks	shackles
bridle hitch	softeners
cable	spreader beam
cable clamps	spreaders
chain	swivel
chain falls	synthetic slings
come-alongs	thimbles
dunnage	tirfor
equalizer beam	turnbuckles
eye bolts	winches
fibre rope	wire rope
hooks	wire rope slings

## **Handling Equipment**

boom trucks	cradle
chain falls	forklifts (telescopic, electric, gas powered)
come-alongs	pallet jack

## **Specialty Tools and Equipment**

cutting tools (oxygen, acetylene)	digital camera
tiger torch	

## Appendix "B"

### Glossary

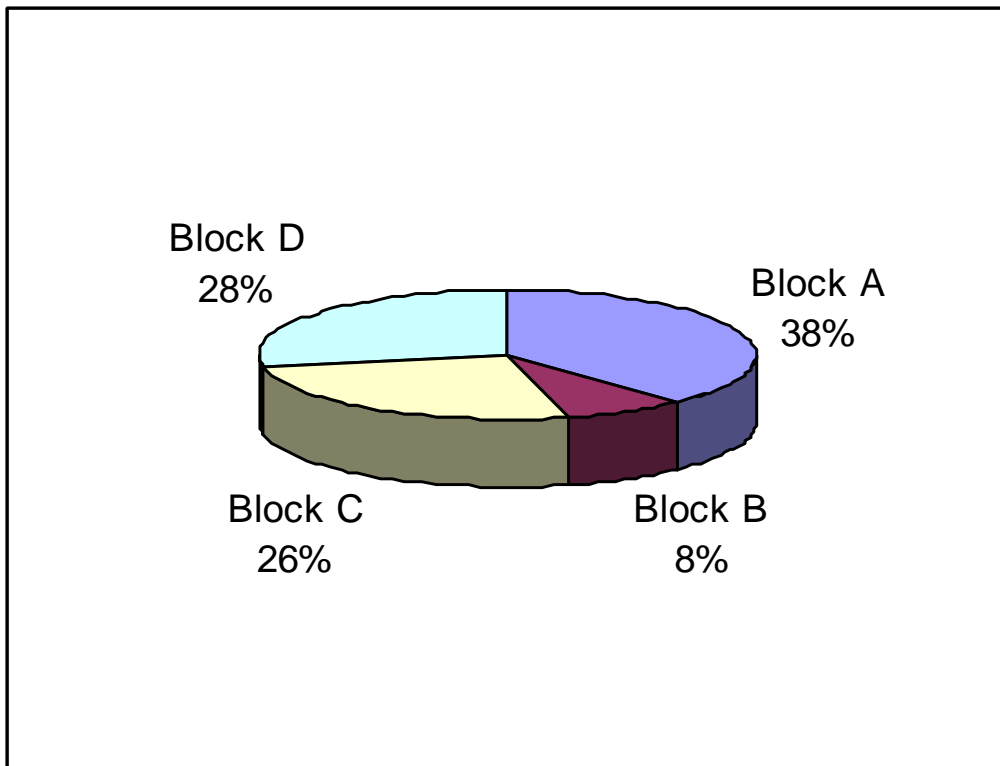
<b>Accessories</b>	Additions to the basic building, such as doors, windows, and ventilators.
<b>Anchor Bolts</b>	Hooked bolts cast in concrete foundations for anchorage of structural members.
<b>Base Angle</b>	Continuous angle fixed to floor slab or grade beam for attachment of all panels.
<b>Base Plate</b>	The plate of a column or beam which rests on the supporting surface.
<b>Beam</b>	Horizontal structural member.
<b>Beam-Column</b>	Building with intermediate columns.
<b>Brace Rods</b>	Rods placed diagonally in roof and walls for transferring wind loads
<b>Caulking</b>	Sealant used in making watertight joints.
<b>Clear Span</b>	Building without internal columns.
<b>Closure</b>	Profiled foam material used inside or outside profiled roof or wall panels to form weather tight seal. Sometimes called a foam closure.
<b>Cold Formed</b>	Various steel shapes manufactured by roll - forming or pressing.
<b>Column</b>	Vertical structural member.
<b>Curb</b>	Raised flashing around roof openings to form waterproof opening.
<b>Eave</b>	Top of the sidewall.
<b>Eave Height</b>	Height from top of eave strut to finished floor level.
<b>Eave Strut</b>	Structural member at the eave which supports roof and wall panel.
<b>Expansion Joint</b>	A break in the construction to allow for thermal expansion.
<b>Flange Brace</b>	An angle from the flange of columns or rafters to girts and purlins to provide lateral support and stability.
<b>Girt</b>	Secondary horizontal member to which wall panels are attached, usually cold formed "Z"
<b>Liner Panel</b>	Interior wall sheeting.
<b>Mezzanine</b>	Intermediate floor between ground floor and first floor or roof.
<b>Partition</b>	Internal wall.
<b>Purlin</b>	Secondary horizontal member to which roof panels are attached usually cold formed "Z"
<b>Rafter</b>	Primary member supported on columns.
<b>Sealant</b>	See mastic-caulking.
<b>Secondary Framing</b>	Secondary members or framing such as girts, purlins, eave struts etc.
<b>Shims</b>	Small steel plates used to level base plates or packing between structural members.



Appendix "C"  
Pie Chart  
Titles of Blocks

Block A	Occupational Skills	38%
Block B	Pre-Erection	8%
Block C	Structure Erection	26%
Block D	Roofing and Cladding	28%

\* The percentages reflect the average amount of time workers within the occupation spend performing these tasks on a yearly basis.



## Appendix “D” DACUM Chart – Task Profile Chart

### Pre-engineered Building Erector

BLOCKS	TASKS	SUB-TASKS			
A Occupational Skills	1. Selects rigging and hoisting equipment.	1.01 Uses hoisting equipment.	1.02 Uses rigging equipment.	1.03 Uses hand signals.	1.04 Works with cranes.
	2. Uses tools and equipment.	2.01 Uses hand tools.	2.02 Uses power tools (electric and gas).	2.03 Uses aerial work platforms.	2.04 Uses survey equipment.
		2.05 Uses scaffolding and ladders.	2.06 Uses oxy-fuel cutting equipment.	2.07 Uses personal protective equipment (PPE).	
	3. Organizes work.	3.01 Maintains safe work environment.	3.02 Communicates with others.	3.03 Coordinates with other trades.	3.04 Communicates electronically.
3.06 Interprets drawings and specifications.					
4. Maintains Pre-engineered buildings.	4.01 Repairs damaged components.	4.02 Strengthens existing structures.			
	5. Performs site inspections.	5.01 Ensures access to site and building.	5.02 Checks layout/elevation of foundation.		
B Pre-erection					

BLOCKS	TASKS	SUB-TASKS				
C Structure Erection	6. Unloads building components.	6.01 Checks shipment/ inventory.	6.02 Sorts building components.			
	7. Pre-assembles components.	7.01 Prepares columns.	7.02 Assembles rafters.			
	8. Erects primary structures.	8.01 Stands columns.	8.02 Erects rafters.	8.03 Torques bolts.		
	9. Erects secondary structures.	9.01 Installs purlins and girts.	9.02 Installs bracing (temporary and permanent)	9.03 Frames openings.	9.04 Installs base angles/ channels.	9.05 Installs canopies and facades.
		9.06 Installs mezzanines.	9.07 Installs partition walls.			
D Roofing and Cladding	10. Installs cladding and insulates wall systems.	10.01 Lays out wall systems.	10.02 Installs metal building insulation.	10.03 Aligns the girts.	10.04 Installs the wall systems.	10.05 Installs liner panels.
	11. Installs cladding and insulates roof systems.	11.01 Lays out roof systems.	11.02 Installs insulation and isolation material.	11.03 Installs roof systems.	11.04 Installs roof curbs.	11.05 Applies sealants.
	12. Installs flashing, gutter and trim.	12.01 Installs windows and doors.	12.02 Installs exterior flashings including eaves and base flashing.	12.03 Installs gutters and downspouts.		