

QUALITY CONCRETE BLOCK FOUNDATIONS

# Precision Basements become

## Buried Treasure

Designing and planning your new residence is a vitally important process, which will have a great influence on the future enjoyment of your home. A successful process will ensure all areas of the home are planned for maximum benefit, present and future and that certainly applies to the construction of the foundation walls and basement.

A properly constructed basement will have far-reaching implications on the life and durability of your residential structure, as well as the warmth and use of the lower area of your home.

In the most recent research manual on defect prevention for new houses, the CMHC and Tarion Warranty Corporation (the new name for the Ontario New Home Warranty Program), identified the foundation wall as the most costly defect to repair. Over 90% of the complaints for foundation walls were related to cracks and

water leaks. Cracks normally occur in the early stages of a foundation's life - during the initial curing process. Foundation walls constructed of concrete masonry units are significantly less susceptible to cracking than other forms of construction as the units are delivered to the project in a cured condition. In fact, through the Canadian Concrete Masonry Producers' Association, concrete masonry products are regularly tested to ensure their strength before they are installed.

Concrete masonry units are installed by trained professionals, resulting in truly straight walls and surfaces that are both smooth and regular... presenting a level bed on which to support the frame, brick, stone or other veneers which form the exterior cladding.

We are pleased to supply this information document so you can discover the benefits of a precision basement constructed of concrete masonry units... "buried treasure".



Canadian Concrete Masonry  
Producers Association  
Region 6 of the National  
Concrete Masonry  
Association



# What you need to know about concrete block basement construction.

## 1. Construction Time

Concrete masonry block offers a time efficient way to construct a precision basement. Most block foundations can be completed and backfilled in just a couple of days. By contrast, a poured foundation should not be backfilled for several days to avoid cracking. Time is Money.



## 2. Cost

Our findings show that masonry block basements can be built as economically, and in some cases for even less than poured basements. Savings may vary, but one fact remains; money NOT spent on your basement can be used to upgrade carpet, cabinets or even build a fireplace.

## 3. Energy Efficiency

A typical masonry block foundation has more than twice the R-value of a poured foundation, saving you even more money when it's time to insulate. The top of a precision built block wall is also much straighter and more level than a poured wall, so air leaks are almost eliminated. The hollow spaces in a block wall also help keep water condensation away from the inside of wall surfaces. That's a real plus when you insulate because insulation works better when it's dry. Poured walls have no choice but to "sweat", which wets insulation. That can be a real problem. Masonry walls provide superior indoor air quality as they limit indoor condensation and therefore bacterial growth such as molds.



## 4. Higher Strength

The field practices of some "poured wall contractors" may involve adding water to the mix to ensure a free flow of concrete to all areas of the form. This often results in changes to the curing cycle resulting in cracks and a loss of strength. A standard concrete block wall has guaranteed built-in strength, block after block and the block used in large commercial buildings are the same type used in your foundation wall. There is no down-grading of product used to build your block basement.



## 5. Construction Flexibility

Concrete masonry is a versatile construction system. Modular by design, concrete masonry basement walls can economically accommodate irregular floor plans, windows, doors, skylight alcoves and

can support fireplaces on both above and below grade levels. Adjustments in the field, or to the final design, can be readily accommodated.

## 6. Dampproofing

A leaky basement is usually caused by a poorly drained site or faulty drain tile installation. A block foundation is dampproofed by applying a cement based parging and/or dampproof membrane. Poured walls are usually sprayed with a thin asphalt paint.

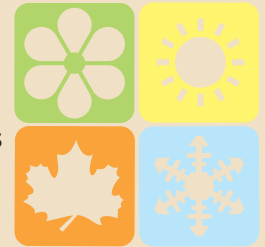


## 7. Repairability

In the unlikely event a masonry block wall cracks, repairs are readily made using regular mortar. When a poured wall cracks, not only does it lose strength, but it also requires a complex set of steps to be followed for successful repair.

## 8. All Weather Construction

Masonry can be constructed in a wide range of weather conditions provided that certain construction methods and protective procedures are followed. Block basements are dramatically less susceptible to the effects of freezing than poured walls. Remember, the entire poured wall must cure in the field. Only the mortar in between the dry blocks must field cure.

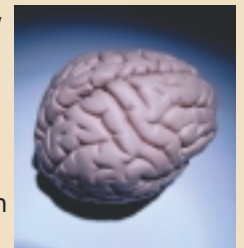


## 9. Ease of Remodeling

By using pre-coloured, pre-finished block, the need for studding and drywall can be eliminated. Even a plain grey block wall looks great with just a coat of paint. Typically, poured walls need studs and drywall to look as good as concrete block. Pre-finished, painted or studded and drywalled block walls are easier to construct and less expensive than poured basements. That's something to consider when you're thinking about adding more living space.

## 10. Rational Choices

Now that you know the facts, the choice is clear. Concrete block is the only building material an informed person can use to build their basement. Concrete masonry is truly the only logical choice in building materials on the market today.



# Design and Construction of a Quality Concrete Block Basement



"As a builder of quality custom homes, I strongly recommend foundations constructed of concrete block. I know I can count on having straight walls, the ability to make last minute changes and the fact that the walls are cured when constructed. The price is comparable and the installation time is reasonable. I have complete confidence in concrete block basements."

Rob Hurlburt, President  
Robert Hurlburt Homes Ltd.  
Richmond Hill, Ontario

Selection of a quality builder is one of the first important steps in planning the construction of a quality basement. Experienced contractors know how to avoid the possibility of defects, such as leaks, problems caused by moisture in materials, air leakage, thermal bridging, mechanical damage and other construction related problems. Quality builders understand the root causes and effects of these problems and they are best equipped to find solutions. Damp or leaking basements are the number one challenge faced by some homebuilders. Simple, but important solutions to moisture handling are as follows:

## 1. Direct water away from the foundation:

- Slope the grade away from the foundation with a grade of at least 50 mm in 1 metre (6 inches in 10 feet).
- Place a layer of clay over free-draining backfill material; this will help to deflect surface water while the backfill below will redirect the remaining ground water to the weeping tiles.
- Avoid directing downspouts into a perimeter drain; direct them at least 900 mm (3 feet) away from the building.
- Avoid landscaping treatments requiring excessive watering in the vicinity of the basement wall.

## 2. Ensure adequate subgrade drainage:

- Wrap geotextile filter fabric around either the drain pipe or gravel and cover with gravel to help keep fine soil and silt from clogging the drainage system.
- Ensure adequate slope of the drainage bed to the outflow point.
- As an alternative, make the wall dampproof; remember this requires perfect coverage and a wall designed to withstand hydrostatic pressures; this is usually not the case with residential construction.

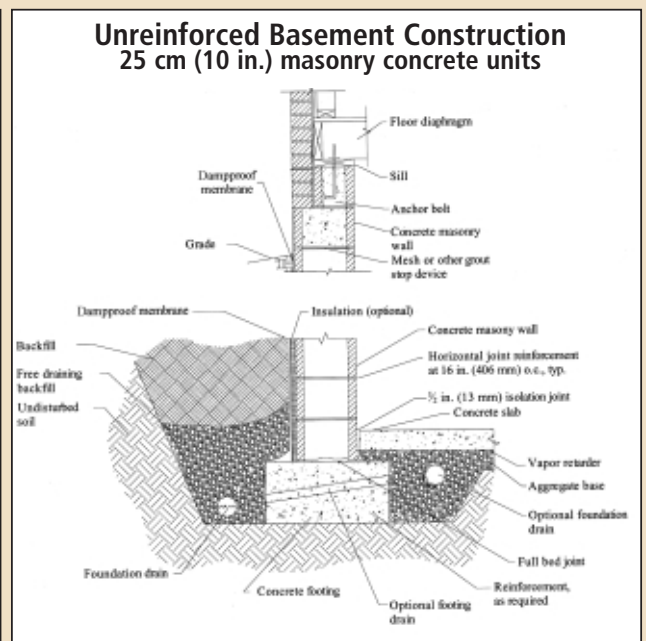
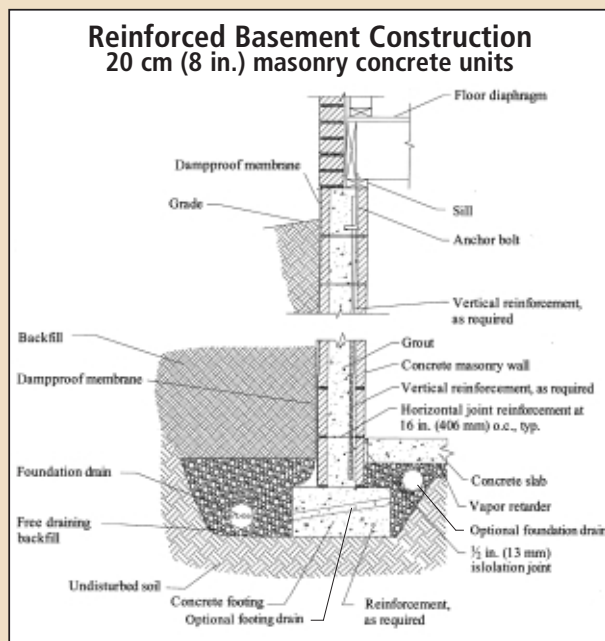
## 3. Detail systems to minimize leakage potential:

- Seal and flash the top edge of the drainage layers and exterior insulation materials.
- Overlap drainage materials in a manner similar to above-grade flashings or roofing features.
- Imbed the lower edge of the drainage layers at least six inches into the perimeter stone.
- Keep the level of the perimeter drain below the basement floor.
- Installation of a dampproof membrane is required/recommended in all forms of basement construction.

Of course the best way to prevent any water leakage or moisture problems is to plan and execute, using the best materials and design possible.

The following drawings illustrate two types of basement construction you would find in premium homes.

Reinforced basement walls can be constructed with 200mm masonry units permitting greater ease of installation, lower material costs and earlier back filling to speed construction.



Since soil conditions, building code requirements and other factors affecting the design may vary even in the same locality, this material is necessarily of a general nature and intended

only to be helpful in illustrating two typical design conditions. The drawings are not intended to serve as working drawings.

# Conventional Basement Construction

## **General Design Considerations**

Basement walls, supporting bearing wall construction, usually are required to support comparatively heavy compressive loads in addition to earth pressure or other lateral loads and to span distances horizontally between intersecting cross partitions or building corners. Such walls may be designed to transmit lateral loads to the floor and footings through bending in the vertical span and little or no horizontal distribution of the lateral loads assumed.

## **Load on Foundation Walls**

### **Dead Loads**

Loads carried by foundation walls may be divided into dead loads, those due to the weight of the superstructure and the foundation itself and live loads, those resulting from application of other forces or pressures to the foundation wall or the superstructure supported thereon.

Concrete block construction is ideal for supporting the kinds of loads typically found in premium and custom homes. In planning a precision basement, other considerations like the effective dead loads should be taken into account during the construction phase. For example, if the design of a basement wall is based on the assumption that the vertical dead load of the superstructure will act to reduce the tensile stresses due to earth pressure moment. Once the floor cap is installed over the foundation walls, backfilling may commence.

### **Live Loads**

The type and magnitude of a live load to be considered will vary according to locality, occupancy and other factors.

## **Plain concrete masonry foundation walls**

### **Materials**

Foundations of plain concrete masonry should be built of good quality units and mortar. Masonry units are ideal for foundation construction. Mortars should have proportions and physical properties conforming to the requirements of current CSA specifications for either Type M or Type S mortars.

## **Superior Building Design**

"Every design project has its own unique challenges and opportunities. Building with concrete block is one decision that consistently returns value to the owners and builders. What is often remarkable is the narrow gap in up-front costs.

Designers know that a decision to build with concrete block is one that they can make with confidence, knowing that their choice will provide secure enjoyment and lasting value. Masonry is just as economical to use when proper design is applied."

### **Dr. Robert G. Drysdale**

*Professor, Martini, Mascarini and George Chair in Masonry Design, Director: Centre for Effective Design of Structures, McMaster University*

## **Straight and true**

Concrete masonry units offer one of the most sought-after features for building precision quality homes – straight and true foundation wall surfaces. Because each unit is dimensionally stable, top surfaces provide a level support for above ground details. And, because walls are constructed in units, unusual and creative designs can be easily accommodated - whether it's that cold storage area or wine cellar... it's no problem!

## **Start with quality masonry units**

Professionally installed concrete block will provide the kind of quality that discerning builders and owners will appreciate. All masonry walls need to be true, plumb and built to the thickness and bond or joint pattern in the plans.



**Poured foundation wall requiring further finishing.**

Where no bond or joint pattern is indicated, units should be laid in straight and even courses, using a running bond pattern with the units of each course breaking joints with the course below.



*Multiple courses allow easy construction of 9' basement walls.*



*Level and true foundation walls provide ideal sills for floor joists and framing.*



*Concrete masonry allows easy design flexibility without the need for custom forms.*



*Once foundation walls are constructed and mortar cured, backfilling may commence.*

### ***How Can We Help You Today?***

If you're planning the construction of a custom home and have decided to build the basement of concrete masonry units, choose blocks available from members of the Canadian Concrete Masonry Producers' Association for assured quality. Contact your nearest member for other useful information.



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