DOWELING REQUIREMENTS FOR CONCRETE FOUNDATION WALLS IN CANADA

TECHNICAL BULLETIN No. 52

Reference Codes: NBCC 2020, CSA A23.3, ICFMA Prescriptive ICF Design for Part 9 Structures (2nd Edition)

Purpose

This bulletin clarifies the requirement for doweling concrete foundation walls to footings in Canadian construction practice, particularly for Insulated Concrete Form (ICF) walls.

Background

In Canadian construction, the connection between walls and footings must ensure structural integrity, prevent differential movement, and withstand lateral and vertical loads. While neither CSA A23.3 nor the National Building Code of Canada (NBCC) always explicitly mandates doweling, both imply it through structural and performance requirements.

Relevant Code References

1. **CSA A23.3 – Design of Concrete Structures**
   - CSA A23.3 governs the structural design of concrete elements.
   - It requires continuity and adequate force transfer between structural elements.
   - In practice, this requires mechanical connections such as dowels between foundation walls and footings to resist shear and moment forces.

2. **National Building Code of Canada (NBCC) 2020**
   Section 9.4 – Foundation Conditions
   - Requires resistance to frost heave and soil movement.

   Clause 9.4.4.4(1):
   "Where a foundation is located in an area where soil movement caused by changes in soil moisture content, freezing, or chemical-microbiological oxidation is known to occur to the extent that it will damage a building, measures shall be taken to preclude such movement or to reduce its effects on the building…"
   This clause implicitly requires a positive mechanical connection (such as dowels) to anchor foundation walls to footings and prevent differential movement due to frost or soil conditions.

3. **ICFMA Prescriptive ICF Design Manual (2nd Edition)**
   Section 2 – Construction
   - 2.1: All walls are assumed to be laterally supported at the top and bottom by structural systems (foundation, floors, roof).
   - 2.2: Foundation walls must be laterally supported before backfilling.
   - 2.3: Lateral support at the bottom shall be provided per NBCC 9.15.4.4 or by doweling.

   Table F.1 Requirement:
   - Doweling the wall to the footing is necessary using:
     - » 15M @ 48" o.c., or
     - » 10M @ 24" o.c.

Conclusion

While the codes may not explicitly state "you must dowel footings to walls," compliance with NBCC and CSA A23.3 performance requirements necessitates doweling in most typical Canadian applications, especially for ICF systems. The ICFMA manual confirms this requirement with prescriptive doweling schedules to ensure structural performance and durability.

Action Required

Ensure all foundation walls are properly doweled to footings per the ICFMA guidelines or as engineered, in compliance with CSA A23.3 and NBCC requirements.