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# Concrete Steps & Porches

Concrete front steps, porches, stoops, landings,  
and stair construction and repair for NB homes

15 Expert Answers from Concrete IQ

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## What's the building code requirement in New Brunswick for the riser height and tread depth on exterior concrete steps at a front entrance?

**The NB Building Code requires exterior concrete steps to have a maximum riser height of 200mm (7.87 inches) and a minimum tread depth of 280mm (11 inches) for front entrance steps.** These dimensions ensure safe navigation, especially important during NB's icy winter conditions when steps become slippery.

The specific requirements for exterior entrance steps are more generous than interior stairs because outdoor steps typically serve fewer people and allow for broader, more gradual steps that are safer in weather conditions. **All risers must be uniform within 6mm (1/4 inch)** — you cannot have one step that's 7 inches and another that's 6 inches, as this creates a tripping hazard. Similarly, **all treads must be uniform within 10mm (3/8 inch).**

**Handrails become mandatory when you have more than three risers** (four or more steps total). The handrail must be between 865mm and 965mm high (34-38 inches) measured from the tread nosing. For steps wider than 1100mm (43 inches), handrails are required on both sides. The handrail must extend at least 300mm (12 inches) beyond the top and bottom steps for safe gripping while mounting and dismounting.

**In NB's freeze-thaw climate, proper step construction is critical for longevity.** Steps must be built on footings that extend below the 4-foot frost line to prevent heave and cracking. The concrete should be air-entrained (4-7% air content) to resist our 150+ annual freeze-thaw cycles. **A slight slope of 1-2% on each tread** helps shed water and prevents ice buildup — standing water on steps becomes a safety hazard and accelerates concrete deterioration through freeze-thaw damage.

**Control joints should be cut between each step** within 24 hours of pouring to control shrinkage cracking. Many contractors skip this detail, but it prevents random cracks that collect water and salt. Apply a penetrating concrete sealer annually to repel moisture and de-icing chemicals.

**Most front entrance step projects require a building permit** in NB municipalities, especially when the steps are part of a new construction or major renovation. Check with your local building inspection office, as some jurisdictions have specific requirements for step width, landing size, and drainage around entrance steps.

**Hire a professional for concrete step construction.** Steps involve complex forming, precise measurements for code compliance, proper reinforcement, and finishing work that must be completed within the concrete's working time. Mistakes in step construction are highly visible, create safety hazards, and are expensive to correct. A typical set of front entrance steps (4-6 steps with landing) costs \$1,500-\$4,000 depending on size and complexity.

## What is the cost of replacing concrete front steps on a 1950s bungalow in Moncton NB?

**Replacing concrete front steps on a 1950s Moncton bungalow typically costs \$1,500-\$4,000, depending on the size, complexity, and finishing options you choose.**

Most 1950s bungalows in Moncton have 3-5 concrete steps leading to a small landing or porch. The total project cost breaks down into removal of existing steps (\$300-\$800), excavation and new footings below NB's 4-foot frost line (\$500-\$1,200), and pouring new steps with proper reinforcement and finishing (\$1,200-\$2,500). A basic replacement with broom-finished concrete runs \$1,500-\$2,500, while decorative options like stamped concrete or exposed aggregate can push costs to \$3,000-\$4,000.

**The Maritime climate makes proper construction critical for longevity.** Moncton experiences over 150 freeze-thaw cycles annually, and concrete steps take a beating from de-icing salt, snow loading, and temperature swings. Your new steps must use air-entrained concrete (4-7% air content) to resist freeze-thaw damage, and the footings must extend at least 4 feet below grade to prevent frost heave. Many 1950s steps were built before modern freeze-thaw protection standards, which is likely why they're failing now.

**Timing matters significantly in Moncton.** The optimal window for step replacement is May through October when ground conditions are stable and concrete can cure properly. Spring replacement (May-June) is ideal because you'll have the full summer and fall to let the concrete mature before facing its first winter. Avoid November through April unless it's an emergency — cold weather concrete requires heated enclosures, special admixtures, and costs 25-40% more.

**Key specifications for NB durability include** 32 MPa air-entrained concrete, proper reinforcement with #10M rebar, control joints to manage cracking, and a penetrating sealer applied after the concrete has cured for 30 days. The landing should slope 1/4 inch per foot away from the house for drainage, and weeping holes or drainage behind retaining portions prevent ice buildup that can crack the structure.

**Most homeowners should hire a professional for step replacement.** This involves excavation near your foundation, forming complex shapes with precise dimensions, coordinating reinforcement placement, and finishing concrete within a narrow time window. The consequences of poor drainage or inadequate frost protection become expensive foundation problems. However, you can save money by handling the demolition yourself if you're comfortable with a sledgehammer and wheelbarrow — just be careful around utilities and your foundation wall.

**Get quotes from 3+ contractors** as pricing varies significantly in the Moncton market. Expect higher quotes in spring (peak season) and potential delays during the busy summer construction period. A quality job with proper

materials and construction should last 25-40 years in Moncton conditions, making it worth investing in the right approach rather than cutting corners on materials or frost protection.

Need help finding a professional concrete contractor? New Brunswick Concrete can match you with experienced step replacement specialists in the Moncton area for free estimates.

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Q3

## How do you prevent concrete porch steps from spalling in New Brunswick when they get repeated salt and sand treatment every winter?

**Concrete spalling on porch steps is almost inevitable in New Brunswick without proper protection, but you can dramatically extend their lifespan with the right concrete mix, surface treatment, and winter maintenance approach.**

The root cause of step spalling in NB is our brutal freeze-thaw cycle combined with de-icing salt penetration. When salt-laden water seeps into the concrete surface and freezes, it expands with tremendous force from within the concrete matrix itself. With 150+ freeze-thaw cycles annually, this internal pressure eventually breaks chunks of concrete away from the surface — that's spalling.

**Prevention starts with the concrete itself.** Any new steps must use air-entrained concrete (4-7% air content) with a minimum 32 MPa strength rating. The billions of microscopic air bubbles give freezing water room to expand without fracturing the concrete. Standard non-air-entrained concrete will spall within 3-5 years on NB steps — guaranteed. For replacement steps, specify a low water-to-cement ratio (maximum 0.45) and consider adding silica fume or fly ash to densify the surface and reduce permeability.

**Surface sealing is absolutely critical** for step longevity in NB. Apply a penetrating silane/siloxane sealer (\$40-80 per gallon) within 30-90 days of installation, then reapply every 2 years religiously. This sealer penetrates 2-4mm into the concrete surface and chemically bonds to repel water and dissolved salts. Unlike film-forming sealers that can peel or wear off, penetrating sealers become part of the concrete structure. For existing steps showing early signs of scaling, clean thoroughly and apply sealer immediately — it won't reverse existing damage but will slow further deterioration.

**Your winter maintenance approach makes the difference between 15-year steps and 40-year steps.** Instead of rock salt (sodium chloride), use sand for traction or switch to calcium magnesium acetate (CMA) if you must use a chemical de-icer. CMA costs 3-4 times more than rock salt but causes minimal concrete damage compared to the devastating effects of sodium chloride. If you must use rock salt, apply it sparingly and wash it off the steps during winter thaws — don't let salt residue sit on the concrete for weeks.

**For existing steps showing spalling**, catch it early with concrete resurfacer or polymer-modified patching compound. Clean out all loose material, apply bonding agent, and patch with a high-quality repair mortar designed for freeze-thaw conditions. However, once spalling becomes extensive (covering more than 25% of the step surface), replacement is usually more cost-effective than patching.

**Hire a professional for step replacement** — the forming, reinforcement, and finishing must be done correctly the first time. Steps are highly visible, structurally important for safety, and expensive to replace. A concrete contractor experienced with NB conditions will specify the right mix, install proper reinforcement, and apply the correct finish texture for slip resistance. Expect to pay \$1,500-4,000 for typical front steps with landing, but quality steps with proper sealing will last 25-40 years in NB conditions versus 5-10 years for poorly specified concrete.

Need help finding a professional concrete contractor experienced with NB freeze-thaw conditions? New Brunswick Concrete can match you with local professionals who understand Maritime climate challenges.

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## How do I replace crumbling concrete front steps in New Brunswick?

**Replacing crumbling concrete front steps in New Brunswick is a job for a professional concrete contractor — the steps require a frost-resistant footing at 4–5 feet depth, proper forming, reinforcement, air-entrained concrete, and finishing, all within a tight working window.** The good news is that new concrete steps, properly built, will last 30–50 years in NB with minimal maintenance.

Before any concrete is poured, the failed steps need to be broken up and removed. Concrete demolition is physically demanding work — a sledgehammer and rotary hammer work for small steps, but for a full set of steps with a landing (typically 1–2 cubic yards of concrete), a concrete saw and small excavator or jackhammer is much faster. Demolition of a standard front step set runs **\$300–\$800** in NB depending on size and access.

**The footing is the most critical element.** NB's frost depth of 4–5 feet means any freestanding step structure needs footings that extend below the frost line. Steps that don't have frost-depth footings will heave every spring, crack, and eventually become unsafe. This is the reason so many older NB front steps are crumbling — they were built on shallow footings that have been heaving and settling for decades. Proper footing installation requires excavation 4+ feet deep, forming and pouring the footing, and waiting for the footing to cure before building the step structure above.

**Forming and reinforcing the steps** is skilled work. Step forms are built from 3/4-inch plywood and 2x lumber, shaped to the exact rise and run dimensions. #10M or #15M rebar is placed throughout the step mass to hold it together and prevent cracking. The forms must be plumb, level, and braced to resist the pressure of fresh concrete. A typical 4-step set with a landing uses 1.5–2.5 cubic yards of concrete — enough that a ready-mix delivery makes sense over mixing by hand.

**Concrete mix specification:** Use air-entrained concrete (4–7% air content) at 30–32 MPa (4,000–4,500 PSI) for front steps in NB. Steps see full freeze-thaw exposure, foot traffic, shovelling, and de-icing salt — the best mix specification pays for itself in longevity. Non-air-entrained concrete will spall within 5–10 years in NB conditions.

**Finishing:** Broom finish the treads for traction. Steps finished too smooth are dangerously slippery in NB winters when ice forms. Edging the step nosings gives a crisp, durable edge that resists chipping.

Apply a penetrating silane/siloxane sealer after the concrete has cured for 28 days — and reapply every 2–3 years. This is the single most effective maintenance practice for extending step life in NB.

Cost for a new set of concrete front steps in NB (3–5 steps with landing) runs **\$1,500–\$4,000** depending on size and complexity. **New Brunswick Concrete can match you with experienced step and porch contractors** in Moncton, Fredericton, Saint John, Dieppe, and surrounding areas for free quotes.

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Q5

## What causes concrete steps to crack and crumble in NB?

**The primary cause of concrete step cracking and crumbling in New Brunswick is the combination of freeze-thaw cycling and de-icing salt exposure — NB's 150+ annual freeze-thaw cycles are among the highest in Canada, and salt compounds the damage significantly.** Underneath that, inadequate concrete specification and shallow footings set many NB steps up to fail from the day they were poured.

**Freeze-thaw scaling** is the most common failure mode. Water — from rain, snowmelt, or de-icing runoff — penetrates the surface pores of the concrete. When temperatures drop below freezing, that water expands by 9% inside the concrete. Over 150 cycles per year, this constant expansion and contraction fractures the cement paste holding the surface together, causing it to flake off in sheets (scaling) or spall in chunks. Tread surfaces are especially vulnerable because they're horizontal and hold water rather than shedding it.

**De-icing salt** accelerates this process dramatically. Sodium chloride (road salt) and calcium chloride lower the freezing point of water, creating more freeze-thaw events at the concrete surface than the air temperature alone would produce. They also introduce chloride ions that attack the steel reinforcement inside the steps, causing rebar to rust, expand, and crack the concrete from within. Many NB homeowners sprinkle salt on icy steps every winter without realizing they're slowly destroying the concrete.

**Shallow or missing footings** cause the structural cracking — the horizontal or diagonal cracks that appear at the joints between steps or at the base of the structure. NB's frost line is 4–5 feet deep. Steps built on footings above the frost line (or directly on the soil with no footing) will heave upward every winter as the frozen ground expands, then settle back in spring. After years of this movement, the rebar fatigues, the mortar joints crack, and sections of

the step start to separate and crumble.

**Poor concrete specification** is common in older NB homes and in DIY repairs. Standard non-air-entrained concrete (25 MPa mix without air entrainment) was widely used for steps in NB until relatively recently. Without the microscopic air bubbles that air-entrained concrete provides (4–7% air content), there's no room for expanding ice water — the concrete fractures instead. Steps poured with non-air-entrained concrete in NB typically show significant spalling within 10–20 years.

**Inadequate cover over reinforcement** allows water and chloride ions to reach the rebar faster. Steps should have a minimum 1.5–2 inches of concrete cover over all reinforcement. If the rebar is too close to the surface, rust staining and cracking appears within a few years of pour.

**Water infiltration at the foundation connection** is worth checking if your steps are attached to the house. Where the step structure meets the foundation or porch, water can collect, freeze, and work the joint open over time. A flexible polyurethane sealant at that joint, reapplied every few years, keeps water out of that critical interface.

For steps that are actively crumbling, a professional assessment is the right first step — minor surface spalling can sometimes be repaired, but structurally compromised steps with heaved footings or rebar corrosion need replacement. **New Brunswick Concrete can connect you with experienced contractors** in your area.

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**Q6**

## **How deep should the footing be under concrete steps in New Brunswick?**

**The footing under concrete steps in New Brunswick must extend below the frost line — a minimum of 4 feet (1.2 metres) below finished grade in southern NB, and 4.5–5 feet (1.4–1.5 metres) in northern parts of**

**the province.** This is the NB Building Code requirement and the most important structural element in any outdoor concrete step project.

This is the rule that gets ignored most often, and it's the reason most deteriorating NB front steps are in the condition they're in. Steps built on footings above the frost line heave every winter. The frost pushes the step structure up and drops it again every spring for 20–30 years. The cumulative movement cracks the concrete, separates sections, fatigues the reinforcement, and eventually makes the steps unsafe.

**Why frost depth matters so much in NB:** New Brunswick's climate is classified as Maritime, which creates more moisture in the soil than drier continental climates. Wet, saturated soil freezes with more expansion force than dry soil — and NB soils in the spring thaw period are among the wettest in the country. The combination of saturated soil and 4–5 feet of frost penetration creates significant heave forces on anything shallow-founded.

## Footing Design for NB Steps

For a standard residential concrete step set (3–5 steps with a landing), the footing system typically uses either:

**Grade beam on frost footings:** Two or more sonotube footings (12-inch diameter minimum) drilled or excavated to 4+ feet depth, filled with concrete and rebar, with a grade beam connecting them at or below grade. The step mass sits on the grade beam. This is the preferred approach for freestanding steps not attached to the foundation.

**Perimeter footing wall:** A continuous concrete footing and stem wall extending to frost depth around the perimeter of the step structure, similar to a mini-foundation. More concrete and labour than sonotubes but very stable.

**Cantilever from existing foundation:** If the steps connect directly to a house foundation, they can be structurally attached (pinned with rebar) to the foundation wall and cantilevered out, relying on the existing foundation for stability rather than their own footings. This eliminates differential movement between steps and house, but requires careful structural design and is typically professional territory.

**Footing sizing:** A typical step footing in NB is 12 inches square for sonotube footings, or 16 inches wide by 8 inches deep for continuous footings. The footing must bear on undisturbed native soil (or properly compacted fill) below the frost line — not on loose, organic, or disturbed material.

In Bathurst and Miramichi, where sustained cold winters push frost deeper, confirm the local frost depth with the municipal building office — the 4.5–5 foot figure is the guidance for northern NB, but soil conditions and microclimate affect the actual depth required.

Don't guess on footing depth for steps — the consequences of frost heave are an unsafe, crumbling set of steps within a few years. **New Brunswick Concrete can connect you with professional contractors** who know NB frost requirements and will build your steps right from the ground up.

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## Can I pour new concrete over old concrete steps in NB?

**You can pour new concrete over old concrete steps in NB, but it rarely produces good long-term results — the overlay tends to delaminate and spall within a few winters, leaving you worse off than before.** For steps that are structurally sound but have surface spalling or scaling, a thin overlay is occasionally viable. For steps with active frost heave, deep cracking, or poor footing depth, overlay is a waste of money.

Here's the core problem with overlaying concrete steps in NB: the overlay is relatively thin (usually 1–2 inches), and thin concrete sections have very little resistance to freeze-thaw cycling. Even with a bonding agent and proper surface preparation, the overlay and the existing concrete slab will expand and contract at slightly different rates due to differential temperature exposure and moisture content. Over multiple NB winters, that differential movement breaks the bond at the interface and the overlay delaminates — often in sheets, and often leaving the surface looking worse than before the repair.

**The bonding strength is also critical.** New concrete will not bond to smooth, weathered, or laitance-covered concrete. Overlaying requires mechanical scarification (grinding or shot blasting) to open the existing surface, a concrete bonding agent or slurry coat, and polymer-modified concrete or mortar for the overlay itself. Even with all that preparation done correctly, the thin section through NB winters is the limiting factor.

**Step-specific challenges:** Tread edges (the nosing at the front of each step) are the most exposed, most stressed, and most likely to chip and delaminate. Overlaid nosings almost always fail first. If the existing nosings are worn, chipped, or rounded, the overlay won't provide a crisp, durable edge.

### When Overlay Actually Works

Overlay can be appropriate for **cosmetic restoration** of steps that are:

- Structurally sound (no shifting, heaving, or separation between sections)
- Have adequate original thickness (minimum 4 inches) so the structure isn't weakened
- Have surface damage limited to scaling, discolouration, or minor spalling (no more than 1/4 inch deep)
- Have intact footings at or below frost depth

For this specific situation, a **polymer-modified concrete overlay** or a **spray-applied concrete texture** (1/8–1/4 inch) can restore the appearance and provide a fresh wearing surface. Cost runs **\$300–\$1,000** for a standard step set in NB, compared to **\$1,500–\$4,000** for full replacement.

**Full replacement is the right choice** when footings are shallow (the steps have been heaving), the step structure is cracked through, sections are separating, or rebar corrosion is visible. Overlaying steps with

structural problems is money spent on a cosmetic fix that hides the real issue for 2–3 years before it looks worse than ever.

**New Brunswick Concrete can connect you with local step contractors** who will honestly assess whether your steps are overlay candidates or need replacement.

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Q8

## What is the proper rise and run for concrete steps in New Brunswick?

The NB Building Code requires exterior concrete steps to have a rise (vertical height per step) between 100 mm and 200 mm (4–8 inches), and a run (horizontal tread depth) of at least 210 mm (about 8.25 inches) — but comfortable, code-compliant residential steps typically aim for a 7-inch rise and 11-inch run. The relationship between rise and run determines how comfortable and safe the steps are to use, which matters considerably in an NB winter when you're navigating icy steps in heavy boots.

The classic rule of thumb used by experienced concrete contractors is the **2R + T = 24–26 inches** formula, where R is the rise and T is the tread (run). A 7-inch rise and 11-inch run gives  $2(7) + 11 = 25$  — a comfortable, natural stride. This formula is a guide based on human biomechanics, not just code compliance.

For NB homes, **7-inch rise and 11-inch tread** is widely regarded as the best combination for residential front steps. Here's why that matters practically:

- A rise higher than 7.5 inches feels steep and fatiguing, especially when carrying groceries or helping elderly visitors. In NB winters with winter boots and slippery conditions, steep steps are a fall hazard.

- A tread shallower than 11 inches doesn't provide enough room for a full foot placement in winter boots. NB winter footwear is bulkier than warm-weather shoes — 11 inches minimum, 12 inches preferred, gives a secure footing surface.
- **Consistency is as important as the dimensions.** Every step in a flight must have identical rise and run — the NB Building Code allows maximum 3/8 inch variation between any two steps in a flight. The human body memorizes the rhythm of a staircase after the first two steps; an inconsistent step breaks that rhythm and causes falls.

## Code Requirements in NB

The National Building Code of Canada (NBC) as adopted in New Brunswick sets these minimums for exterior stairs:

- Minimum tread width: 210 mm (8.25 inches)
- Maximum rise: 200 mm (7.87 inches)
- Minimum rise: 100 mm (3.94 inches)
- Maximum variation in rise between steps: 9 mm (3/8 inch)

For steps serving an entrance used by the public or a rental unit, handrail requirements kick in at 3 or more risers — a graspable handrail must be installed on at least one side.

**Tread slope for drainage:** Exterior step treads should slope forward (toward the edge) at approximately 1–2% to encourage water to run off rather than pool. Standing water on step treads creates ice in NB winters — a gentle forward pitch is a safety feature, not just an aesthetic preference.

For a custom step project or to confirm code compliance in your municipality, **New Brunswick Concrete can connect you with experienced step contractors** in Moncton, Fredericton, Saint John, Bathurst, and beyond.

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## How do I build concrete porch steps with a landing in NB?

**Building concrete porch steps with a landing in New Brunswick is a multi-phase project that requires frost-depth footings, careful forming, air-entrained concrete, and proper reinforcement — it's one of the more complex flatwork jobs for a residential contractor and is generally not a DIY project given the structural requirements and volume of concrete involved.** Here's what the process looks like from start to finish.

**Phase 1 — Planning and permits.** Determine your total rise (the vertical distance from finished grade to the porch floor level), then divide by your desired rise per step (7 inches is standard) to get the number of steps. A landing — the flat platform at the top or an intermediate level — should be at least 36 inches deep in the direction of travel and as wide as the doorway plus clearance on both sides (minimum 36 inches wide; 48 inches or wider is more comfortable). Check with your local building office in Moncton, Fredericton, or Saint John — some municipalities require a permit for steps over a certain size, particularly if they're connected to the house.

**Phase 2 — Excavation and footings.** Excavate below the step and landing footprint to frost depth — 4 feet minimum in southern NB, 4.5–5 feet in northern NB. The footing can be formed as either sonotube pier footings (12-inch diameter minimum) or a continuous perimeter footing wall. Pour the footings with 25–30 MPa concrete and allow to cure for at least 7 days before building the step structure above.

**Phase 3 — Building the form work.** Forms define the shape of the steps and landing. Use 3/4-inch plywood for the risers (the vertical face of each step) and 2x8 or 2x10 lumber for the sides. Each riser form must be positioned precisely at the correct rise height and well braced — fresh concrete exerts significant hydraulic pressure on forms, especially for a mass with a landing. The landing form is essentially a flat box at the top of the structure. Apply form release oil to all form surfaces before pouring.

**Phase 4 — Reinforcement.** Place #10M rebar throughout the step and landing mass, typically in a grid pattern at 12-inch centres horizontally and vertically. Maintain a minimum 1.5-inch cover from the concrete surface to the nearest rebar. Tie the rebar grid to the footing rebar for structural continuity. Steps without reinforcement will eventually crack into pieces; reinforcement holds the structure together even after cracking occurs.

**Phase 5 — The pour.** Order air-entrained 30–32 MPa ready-mix concrete. A typical 4-step set with a 3x4-foot landing uses approximately 1.5–2.5 cubic yards. Pour the steps from the bottom up, consolidating each section with a vibrator or rod to remove voids. Finish treads with a broom texture (front-to-back strokes for good traction), and slope each tread forward 1–2% for drainage.

**Phase 6 — Curing and sealing.** Cover with plastic or curing compound for 7 days minimum. After 28 days, apply a penetrating silane/siloxane sealer.

Cost for steps with a landing in NB runs **\$2,000–\$5,000** installed. **New Brunswick Concrete can match you with experienced porch and step contractors** for free quotes in your area.

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## Should concrete steps be attached to the foundation in New Brunswick?

Whether to attach concrete steps to the foundation in New Brunswick is a genuine technical debate among contractors — there are valid arguments on both sides, and the best answer depends on whether the steps have their own frost-depth footings. The key issue is preventing differential movement between the steps and the house foundation during NB's spring frost heave season.

**The argument for attaching steps to the foundation:** If the steps are structurally connected to the house foundation wall (using rebar pins drilled and epoxy-anchored into the foundation), the steps can't move independently. Any frost heave force acting on the steps must overcome the entire resistance of the house foundation — a much more stable system. This approach works well when the step structure is well-built with its own frost-depth footings AND connected to the foundation, creating a redundant system.

**The argument against permanent rigid attachment:** If the steps are attached rigidly to the foundation but don't have adequately deep footings, frost heave will crack either the step structure, the foundation wall, or both at the connection point. A rigid joint between two elements that move differently is a stress concentration — something has to give. Many NB contractors prefer to leave a deliberate **1/2-inch expansion gap** between the step structure and the house foundation, filled with a flexible backer rod and polyurethane sealant. This allows slight independent movement without cracking either structure.

### **The practical NB approach used by most experienced contractors:**

For **steps with proper frost-depth footings** (4+ feet deep): Either attachment or a sealed gap works. The steps are stable enough that differential movement is minimal.

For **steps without frost-depth footings** (a common situation in older NB homes where you're replacing existing steps): A sealed gap is strongly preferred. Attaching steps with shallow footings to the foundation transfers the frost heave force directly to the foundation — not a good outcome.

**The expansion joint detail:** Where steps meet the foundation wall, fill the gap with a foam backer rod (sized 1.25x the gap width) and top with a polyurethane concrete caulk. This sealant accommodates movement, keeps water out of the joint, and is easily re-applied every 5–10 years as it weathers. Water getting into the joint between steps and foundation is the most common cause of foundation face damage in NB — the joint freezes, expands, and chips the foundation parging.

For new step construction in NB, the best practice is: **frost-depth footings for the steps + rebar connection to the foundation + sealed flexible joint at the surface.** This gives you structural continuity without a rigid joint that concentrates stress.

**New Brunswick Concrete can connect you with experienced step and foundation contractors** in Moncton, Fredericton, Saint John, and surrounding communities who can advise on the right connection detail for your specific situation.

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**Q11**

## How do I repair spalling on my concrete porch in Moncton?

**Repairing spalling on a concrete porch in Moncton requires cleaning off all loose and delaminated material, profiling the surface for bonding, applying a polymer-modified patching compound or overlay, and sealing the repaired surface before the next freeze-thaw season.** Done properly, a spalling repair can last 10–15 years; done poorly (wrong product, inadequate prep, wrong timing), it delaminates by spring.

Moncton's location in the Petitcodiac River valley gives it a classic Maritime climate with significant freeze-thaw cycling — typically 100–150 cycles per year — plus exposure to salt-laden snowmelt from surrounding roads. Porches face the worst of it: horizontal surfaces that hold water, exposed to full weather, and often sprinkled with de-icing salt by homeowners trying to keep the entry safe in winter.

**Assess the damage first.** Tap the porch surface systematically with a hammer or metal rod. A hollow sound indicates delamination — the concrete beneath is already separating from the layer above. All hollow areas must be removed before patching; applying a repair mortar over delaminated concrete traps the problem and the new patch will come off with the old layer.

Use a cold chisel and hammer (or rotary hammer with chisel bit) to remove all spalled, delaminated, and hollow concrete back to solid, sound material. The patch needs minimum 1/4-inch depth to hold; ideally 1/2 inch or deeper

for better bonding area. Feathered edges (tapered thin at the perimeter) don't work for concrete repairs — chip the edges square or slightly undercut for mechanical interlock.

**Surface preparation is everything.** Pressure wash the repair area thoroughly to remove dust, laitance, and any remaining loose material. Allow to dry completely — apply a concrete bonding agent (acrylic or epoxy-based) and let it become tacky before applying the patch.

#### **Choose the right repair product for Moncton's climate:**

- **Polymer-modified mortar** (like Quikrete Sand Mix with acrylic fortifier, or Sika MonoTop) — best for repairs 1/4 inch to 2 inches deep. Bonds well, flexible enough to handle freeze-thaw cycling, widely available at Moncton building supply stores.
- **Rapid-setting concrete** — good if you need to return the porch to use quickly, but has less bond strength than polymer-modified systems.
- **Void** standard Portland cement mixed with water only — it will delaminate quickly in Moncton's climate without a polymer fortifier.

Apply the repair mortar in layers no thicker than 1/2 inch per lift for deep repairs. Feather the edges to blend with the surrounding surface. Broom-finish the repaired area to match the existing texture and ensure safe traction in NB winters.

**Cure and seal.** Cover with plastic sheeting for 3–7 days to retain moisture during curing. After 28 days, apply a penetrating silane/siloxane sealer over the entire porch surface — not just the patched area. This is essential for Moncton porches and should be reapplied every 2–3 years.

For large-scale spalling that covers more than 30–40% of the porch surface, a full resurfacing overlay or replacement may be more cost-effective than patching individual spots. **New Brunswick Concrete can match you with experienced local contractors** for an honest assessment and repair quotes.

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Q12

## What is the best way to prevent concrete step heaving in NB?

**The best way to prevent concrete step heaving in New Brunswick is to build the steps on frost-depth footings — a minimum of 4 feet deep in southern NB and 4.5–5 feet in the north.** Everything else — drainage, gravel base, sealing — is supplementary. Frost heave is caused by freezing soil pushing upward, and the only reliable way to stop it from moving your steps is to get the footing below the frost line where the soil doesn't freeze.

For existing steps that are already heaving, the uncomfortable truth is that there's no long-term fix short of rebuilding them with proper footings. You can temporarily stabilize heaved steps by underpinning them or filling voids beneath them, but if the footings are shallow, the frost will continue to work on the structure every year. The money spent on repeated temporary repairs typically exceeds replacement cost within a decade.

**For new step construction, here's the prevention checklist:**

- 1. Frost-depth footings.** This is the non-negotiable foundation of a frost-stable step structure. Sonotube footings drilled to 4+ feet, or a continuous footing wall to the same depth, bearing on undisturbed soil. In Fredericton and Saint John, confirm the minimum depth with the local building office — soil conditions affect the requirement.
- 2. Free-draining granular base.** Under the step mass itself, compact 6–8 inches of granular B gravel. Better yet, use 4-inch clear stone (no fines) immediately below the step structure — water drains through immediately with no capillary rise. Saturated soil freezes with dramatically more force than dry soil. Removing water from around the footing zone removes the energy source that causes heave.
- 3. Drainage away from the steps.** The grade surrounding the steps should slope away from the structure in all directions at 2% minimum. Ensure eavestroughs and downspouts don't discharge near the steps — directing 200,000 litres of annual roof runoff toward your step footing area saturates the soil unnecessarily.
- 4. Expansion joint at the foundation wall.** Where steps meet the house foundation, leave a 1/2-inch gap filled with backer rod and flexible polyurethane sealant rather than a rigid connection. This allows the steps to move slightly (they will, even with good footings) without cracking the house foundation or tearing the steps apart. Inspect and reapply the sealant every 5–10 years.
- 5. Air-entrained concrete.** The step structure itself should be poured with air-entrained concrete (4–7% air content, 30 MPa). This prevents the concrete from absorbing water that then freezes within the concrete matrix — freeze-thaw damage to the concrete itself is a separate problem from frost heave of the soil, and air entrainment

addresses the former.

**6. Penetrating sealer.** Apply a silane/siloxane penetrating sealer after the first 28 days of curing and reapply every 2–3 years. This reduces water absorption into the concrete and into the soil immediately below the step structure.

For existing steps that heave seasonally and haven't needed to be rebuilt yet, address drainage and sealing as interim measures, and plan for replacement with proper footings within the next renovation cycle. **New Brunswick Concrete can connect you with step and foundation contractors** across NB for assessments and rebuild quotes.

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## How long do concrete steps last in New Brunswick before needing replacement?

**Properly built concrete steps in New Brunswick — with frost-depth footings, air-entrained concrete, adequate reinforcement, and regular sealing — can last 40–60 years before needing replacement.** Poorly built steps, or steps exposed to heavy de-icing salt without sealing, commonly fail within 15–25 years. The range is wide because the quality of the original construction matters far more than the material itself.

NB's concrete steps tend to fall into two categories when contractors inspect them:

**Well-built steps** made with the right concrete (air-entrained, 30 MPa or higher), proper footing depth (4+ feet below grade), adequate rebar throughout, and a homeowner who has sealed the surface every few years and avoided rock salt — these steps look solid at 40 years, with only cosmetic surface wear. They may eventually be replaced for aesthetic reasons (matching a renovation) rather than structural necessity.

**Poorly built steps** — standard non-air-entrained concrete, shallow footings, no or minimal rebar, and annual rock salt applications — start showing significant spalling and cracking at 10–15 years. By 20–25 years they are commonly hazardous, with delaminated treads, crumbling risers, and heaved or separated sections.

### The Factors That Determine Lifespan

**Footing depth** is the single biggest factor for structural longevity. Steps with frost-depth footings (4–5 feet in NB) don't heave, so they don't experience the annual structural stress that cracks rebar and separates sections. Steps with shallow or no footings typically require replacement when the cumulative heave damage becomes structurally unsafe — often 20–30 years, sometimes less.

**Concrete specification** determines surface longevity. Air-entrained concrete with 30+ MPa strength in NB exterior exposure lasts 40+ years on the surface. Non-air-entrained concrete in NB's 150 annual freeze-thaw cycles starts scaling within 5–10 years and typically requires resurfacing or replacement at 20–25 years.

**Salt exposure** accelerates deterioration dramatically. Steps that receive regular rock salt applications (sodium chloride) show significant surface scaling within 10–15 years, and chloride ion penetration begins attacking the rebar, causing expansive rust cracking. Switching to sand for traction and calcium magnesium acetate (CMA) if de-icing is truly needed extends surface life considerably.

**Sealing** adds years to step life. A penetrating silane/siloxane sealer reduces water and chloride ion absorption by 60–80%. Homeowners who seal every 2–3 years consistently report better step condition at 30+ years than neighbours who never seal.

**Signs replacement is needed:** Hollow sound when tapping treads, sections that rock or shift, cracking that has separated the step structure into discrete pieces, visible rebar corrosion (rust staining), treads worn to less than 3 inches of thickness, or step height/depth that has changed due to heaving to an unsafe degree.

For steps approaching 30 years or showing any structural symptoms, a professional assessment is worthwhile.

**New Brunswick Concrete can match you with local contractors** in Moncton, Fredericton, Bathurst, Riverview, and surrounding areas for an honest evaluation of repair vs. replacement.

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**Q14**

## **Do I need a railing on concrete steps in New Brunswick?**

**Yes, in most cases NB building code requires a handrail on concrete steps — specifically when there are more than two risers (three or more steps).** This applies to both new construction and renovations, and the requirement is enforced under the National Building Code as adopted in New Brunswick.

The specific rule is straightforward: any stairway with more than two risers requires a handrail on at least one side. If your front steps have three or more steps from grade to your door — which is common in New Brunswick given how homes are raised on frost-depth foundations — you need a compliant railing. Steps with four or more risers on an open side (meaning a drop of more than 600 mm / about 24 inches) typically require a full guardrail, not just a handrail, to prevent falls.

The practical distinction between a handrail and a guardrail matters here. A **handrail** is a graspable rail you hold while walking up or down. A **guardrail** is a protective barrier meant to prevent someone from falling off the edge. NB building code specifies guardrail height of at least 900 mm (35 inches) for residential exterior stairs and landings

where the drop is significant. Handrails must be graspable — typically a round or oval profile that your hand can wrap around — rather than a flat surface.

For new concrete steps, your building permit inspection will include a check for railing compliance. For existing steps without a railing, the requirement typically applies when you pull a permit for renovations or when your municipality performs a property inspection. That said, proper railings are a safety necessity regardless of the permit situation — NB's icy winters make a secure, graspable railing on your front steps genuinely important from November through April.

**Material options** for railings on concrete steps include steel pipe (galvanized or powder-coated), wrought iron, aluminum, and stainless steel. Treated wood is also used but weathers more quickly in NB's Maritime climate. Metal railings anchored into the concrete with expansion anchors or embedded post bases tend to be the most durable choice for our climate.

If you are unsure whether your existing steps require a railing or whether a proposed railing design will meet code, contact your local municipal building department — Moncton, Fredericton, Saint John, and most larger NB municipalities have building inspection offices that can answer this in a quick call. New Brunswick Concrete can connect you with local concrete professionals who handle step railing installations as part of their concrete work.

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**Q15**

## **How do I add a railing to existing concrete steps in NB?**

**Adding a railing to existing concrete steps involves anchoring steel or iron posts into the concrete, either by drilling and using expansion anchors or by core-drilling to set posts in grout — both are reliable**

**methods for NB conditions.** The approach you choose depends on the condition of your steps, the railing style, and whether you are doing it yourself or hiring a professional.

**The most common method** for attaching railing posts to existing concrete steps is using surface-mount post bases with expansion anchor bolts (such as Simpson Strong-Tie or similar hardware). You drill into the concrete with a hammer drill and masonry bit, insert expansion anchors, and bolt the post base down. The post then slips into or bolts onto the base. This method works well when your steps are in good condition — solid concrete with no significant cracking or spalling at the anchor locations. The anchors need a minimum of 2-3 inches of solid concrete to develop their full holding strength.

**Core drilling** is the other approach: a professional drills a hole through the step nosing or riser face, sets a steel sleeve, and fills it with non-shrink grout or epoxy anchor. This creates an embedded post that is extremely secure and looks cleaner than surface-mounted hardware. It is the preferred method for high-traffic entrances and is what most concrete contractors use when they build steps from scratch with railings incorporated.

Before drilling into your existing steps, assess their condition carefully. NB concrete steps that are more than 15-20 years old may have significant spalling or internal delamination from our 150+ annual freeze-thaw cycles — drilling into compromised concrete can crack the step further or result in anchors that don't hold. If your steps look rough, have chunks missing, or sound hollow when tapped, consider repairing or replacing them before adding railings.

**NB building code requirements** apply here: the railing system must meet handrail height (between 865 mm and 965 mm above the stair nosing), be capable of withstanding a 0.9 kN (about 200 lbs) point load, and be graspable along its full length. If your steps have four or more risers or an open side with a significant drop, a full guardrail system with infill (balusters or a solid panel) is required.

For a basic three-to-four step entry railing, plan on spending **\$400-\$1,200** for a professional installation with a powder-coated steel or aluminum railing. Custom wrought iron work runs higher — \$800-\$2,500 depending on design complexity. Galvanized and powder-coated finishes hold up best in NB's salt-air and freeze-thaw environment; bare steel will rust quickly without a quality finish.

If you are handy and your steps are in good shape, a simple pipe or aluminum railing with surface-mount bases is a manageable DIY project. For anything involving core drilling, compromised concrete, or a complex railing design, hiring a concrete or ironwork professional will give you a safer and longer-lasting result. New Brunswick Concrete can connect you with local professionals who handle step railing installations.

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