

Pacific West Home Inspections

Residential & Commercial Building Inspections

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Site 16 Comp 22 RR1 Sorrento, British Columbia, Canada. V0E 2W0

Phone: 250 835-8751 • Toll Free: 1-866-966-8751 • Cell: 250 833-8955 Fax: 250 835-8751

Website: www.bchomeinspections.ca • E-mail: inspector@bchomeinspections.ca

Report #: 2743-2010

June 24th, 2010

Mr & Mrs Smith

111 Stairs Unlimited Road
Kamloops, BC.

Dear Mr & Mrs Smith

RE: Exterior Deck Stairs Construction Inspection

On June 23rd, 2010, Mr & Mrs Smith contacted Pacific West Home Inspections in relation to a concern that he had of certain general works performed by a local contractor on a completed design and construction of one set of wooden exterior stairs located at his home at 111 Stairs Unlimited Road in the City of Kamloops, B.C. The stairs are located at the north side of the home leading off the east end of the deck.

1.0. Purpose Of Contact

Mr Smith contacted Pacific West Home Inspections due to the concern of the end product of the wooden stairs in such, by visual observation, that in his opinion, maybe potentially constructed below today's construction standards, practices and code requirements for the design and construction of exterior stairs and such could potentially pose a certain safety hazard. Therefore, after a lengthy conversation, Mr Smith obtained my professional services to perform a on-site visual inspection of the newly constructed stairs and formulate a written report whether the stairs meet or exceed today's building standards, practices, code requirements and typical workmanship which includes any possible indication of a safety issue the stairs may or may not pose at this time.

The day of the inspection was Wednesday, June 23rd. I arrived on-site around 11:25 am at the above address and was shown the exterior stairs.

2.0. On-Site Inspection Evaluation

2.1. Stairs Description: The stairs are constructed of treated wood with the exception of a few pieces of wood components located at the top of the stairs which is the skirting board components. The stairs have three separately cut stringer type and have a span of approximately 11 feet given a few plus inches. Bottom of the stairs are directly in contact to the surface of the concrete patio and the top attached directly to an opening at the deck. Both sides of the stairs has metal hand railing installed which are the full length of the stairs with the top attached to the existing deck guard railing and the bottom of the rail ending within a vertical metal square post.

2.2. Contractor: No other information is provided about the contractor that constructed the stairs with the exception that he is local and resides within the City of Kamloops. Additionally, the following is also not known about the contractor:

- 2.2.1. Name of the contractor and his business is unknown.
- 2.2.2. Years as a building contractor and for how long in business unknown.
- 2.2.3. Building construction experience, knowledge and training in his field of expertise is unknown.
- 2.2.4. Certification as a builder or renovation contractor unknown.
- 2.2.5. Registered with a professional B.C. building organization unknown.
- 2.2.6. Licensed with Consumer Protection B.C. unknown.
- 2.2.7. Carry professional liability insurance unknown.
- 2.2.8. Registered with Workers Compensation of B.C. unknown.
- 2.2.9. Carry a business license unknown.
- 2.2.10. Anything in relation of knowing the contractor not known.

2.3. Inspection Evaluation Of Stairs: This inspection evaluation of the stairs are performed by a specific professional standard which is available for viewing on the web. The standard is universal and for the most part, used by professionally certified home inspectors and building inspection organizations such as the following:

- 2.3.1. British Columbia Institute of Property Inspector (BCIPI) - www.bcipi.org.
- 2.3.2. Canadian National of Certified Home Inspectors (CanNACHI) - www.cannachi.org.
- 2.3.3. International Association of Certified Home Inspectors (InterNACHI) - www.nachi.org.

Further, due to the nature of this particular surrounding circumstances, the inspection evaluation of the stairs will include that the stairs were constructed by code requirements which would be the British Columbia Building Code 2006 (BCBC2006). Additionally, the inspection evaluation will take into account of building practice's such as the use of better building material, quality of workmanship, installation of materials and finish end product such as looks.

3.0. British Columbia Building Code 2006 Information

Stair building code requirements are not something that should be ignored. Basic stair building construction techniques involving stringer spans, post size and loads, riser and tread sizes and spans between deck and grade, board dimensions, height of railings and load capacity are all discussed in the building code. Specifications relate to maximum rise, minimum tread size, railing heights and spacing between balusters. There are also minimum standards for the size of actual hand rails.

Most of the building code requirements that apply to building stairs are universal standards based on the physical properties of stair building materials commonly in use around the world today. The following information is code requirements for stair construction.

3.1. Width: Exterior stairs serving a single dwelling unit shall have a width of not less 34".

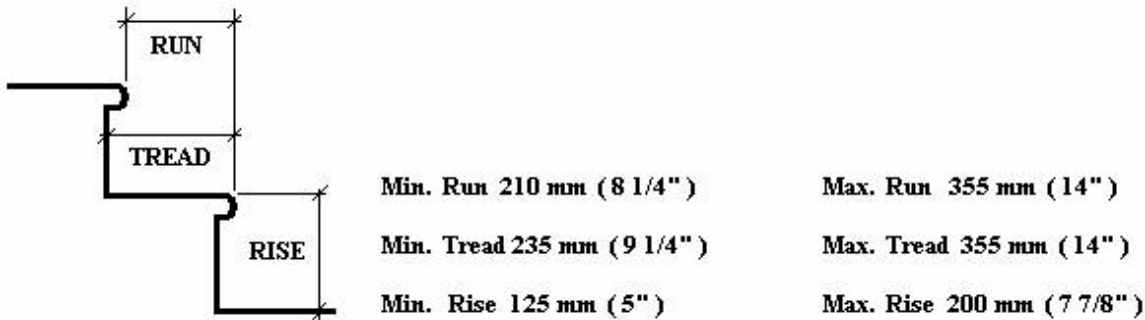
3.2. Unit Rise and Unit Run: Unit rise and run refer to the overall vertical and horizontal change between each stair tread – not the actual tread size.

Maximum unit rise of 7 7/8" and must be no less than 5".

Minimum unit run of 8 1/4".

Minimum tread width of 9 1/4" and no more than 14".

No more than 3/8" difference between any rises (should always be equal).



3.3. Stringers: The building code specifies that wood stringers meet minimum sizes for obvious reasons.

1 1/2" thick (2x material) minimum if no supports along its length.

1" thick minimum if supported along its length.

3 1/2" minimum effective depth size (the narrowest part after cutting all the rise and run notches) 9 1/4" width (2x10) minimum

Stringers must not have direct contact with ground unless treated with wood preservative.

Stringers must be secured at top and bottom.

36" maximum space between stringers with open rises.

48" maximum space between stringers with closed rises.

At least 1 1/2" (2x material) thick for open risers and stringers spaced 30" or more apart

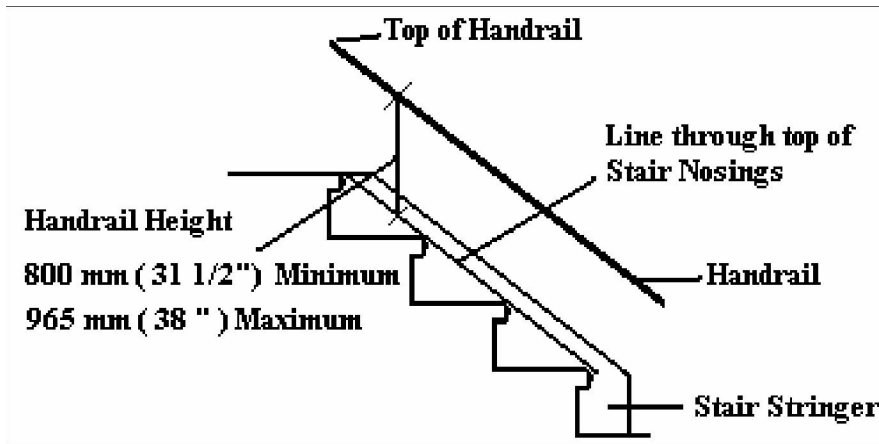
At least 1" nosing if the unit run (not the actual tread) is less than 10"

3.4. Deck Stair Hand Rails: Special requirements under the building code.

4" maximum space between balusters.

A 6" ball must not pass between the triangular space created underneath the bottom rail, the riser and the tread.

At least 31 1/2" (not more than 38") measured vertically above a line drawn through the outside edges of stair nosing.



4.0. Present Conditions And Issues Of Stairs

At the time of the inspection evaluation of the stairs, the following conditions and issues were observed of the following construction components of the stairs at various locations.

4.1. Stairs Length: Found that the stairs to be 11 feet plus in span length. Upon walking upwards to the bottom of the stairs and downward along the stairs, the stairs were apparently very wobbly in a up and down and side to side motion which appeared significantly more than the norm with a set of stairs (approximately 200 lbs of weight on stairs). In consideration of two or more persons using the stairs and/or using the stairs for moving future household items, I would question in the use of the stairs to hold any additional weight. It is typically standard to construct either wood bracing at mid span along the bottom of the stairs stringers and/or reinforce each one of the stringer along their full length. This can be achieved in more detail with the following:

4.1.1. Recommendation: With the stringers more than 10 feet long I recommend installing a rigid beam at mid span to add support to the structure. Stair stringers strength is considerably weakened by the cuts made to create the stair surfaces and stairs must be strong to withstand very stressful conditions. It is preferable to break long stair runs with intermediate landings both visually and structurally but in some cases you may need to use one long run. A brace will dampen the shear stress that can compromise the stringers integrity in the center of the stairs. Most deck stairs are under built and as a result feel bouncy and are a risk to collapse especially after weathering can propagate cracks in the stringers which evidently is presently observed at some ends. You can also double the stair stringers by nailing two 2x12's together like a beam in order to increase strength. Adding blocking between stringers can also strengthen the entire stair structure.

4.2. Stair Risers Openings: The opening between the tread risers have significant openings of 5 1/2 to 6 inches varying along the entire length of the stairs. The openings should be treated as the same as an opening along a deck guard rail or a hand rail.

4.2.1. Recommendation: Most typically deck projects use closed risers to finish the stairs. Open risers appear cheap and unfinished. They are also often in violation of code requirements, which maintains that they meet the same requirements as guardrail infill. Stair risers may not have openings present that would allow a 4" diameter sphere to pass through. Most risers are made from deck boards or fascia. Install material that is heavy duty enough to resist feet kicking the risers. Using 1x material you will want to install blocking behind the riser board for added strength.

4.3. Treads And Risers: Found that there is an inconsistency of the stairs risers and treads. As an example, the following were noted and measured starting at the top of the stairs.

a) Riser - 9 1/4" / Tread - 11 1/2".

b) Riser - 7 1/2" / Tread - 9 1/2".

c) Riser - 8 1/2" / Tread - 10".

As viewed, there are discrepancies of the risers and treads which the riser should not have more than a 3/8" difference.

4.3.1. Recommendation: Replace the stairs treads and risers so that they conform evenly throughout the entire length of the stairs.

4.4. Bottom Rail: The bottom of the hand rail opening is larger than required. The opening varies from 7 1/2" to 13" along the entire length. A 6" ball must not pass between the triangular space created underneath the bottom rail.

4.4.1. Recommendation: The triangular space needs to be conforming so that the triangular space is 6 inches or less.

4.5. Stair Width: The stairs treads are 42" wide from end to end. The measured width from the inside hand rail components at the bottom of the stairs is 33 1/2" and at the bottom of the stairs between the square hand rail posts are 31 3/4".

4.5.1. Recommendation: The space between the hand rail components should not interfere with the width of the stairs which need to be 34" and therefore, width needs to be adjusted.

4.6. Hand Rail Height: The top height of the hand rail is inconsistent along the entire length. At the top of the stairs, the top of the hand rail height as measured from the surface of the stair tread is 46". At the bottom of the stairs, the top of the handrail height as measured from the surface of the stair tread is 33".

4.6.1. Recommendation: The height of the hand rail along the entire length of the stairs should be uniformed and therefore, height should be adjusted that the top of the hand railing is at least 32 1/2" and not more than 38".

4.7. Stair Stringer Spacing: In general, spacing between the stringers typically is never more than 24". The spacing between the stair stringers vary from between 18" to 20" center to center. Spacing between the stringers are measured ununiformly such as the following:

a) Top of stairs - 18 1/2" / 19 1/2".

b) Mid span - 18" / 20".

c) Bottom of stairs - 18 1/4" / 19".

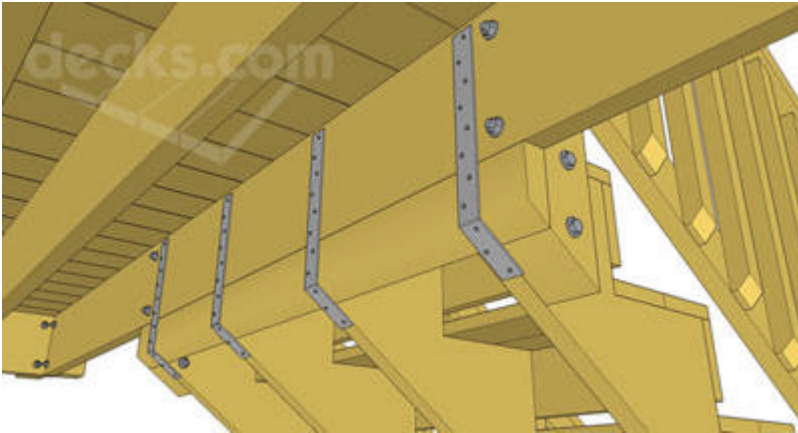
4.7.1. Recommendation: No significant changes required, however, typically, even spacing of the stringers is a standard good building practice.

4.8. Stair Stringer Attachment: Presently viewed, 1/2" untreated plywood is attached directly to the outside surface of the deck's metal flashing. The plywood itself is only attached with 11 separate #8 - 3" metal screws which are not full thread type. It appears that all of the stair stringers are attached to a untreated 2x4 attached along the bottom of the plywood sheathing. By appearance, all three of the stringers are then connected individually by one small metal angle bracket at one side of the stringer. Each of the small metal brackets are fastened into place with a total of four #8 - 1" metal screws to each of the wood members with the exception of one bracket that has one additional screw.

4.8.1. Recommendation: The present construction, the stair stringer attachment appears to be poorly installed and material used likely to be under sized.

How one attaches the stair stringers to the top of the deck and to any landings is critical. It should be reinforced at the rim behind the stairs to provide a solid base for attachment. Need to install positive connections to install stair stringers using joist hangers and/or angled brackets to the front face to provide adequate support.

The first tread steps down from the deck must extend the rim joist to create a solid surface below the deck rim to attach to. You should attach a 2x6 or 2x8 under the rim flush to the bottom of the stringer using strap ties or bolted cleats for added strength. Also additional use of metal strap ties can be bend along the bottom of the stringer and over the top of the rim joist for added support (see diagram example below).



4.9. Workmanship Notables:

After viewing all areas of the stairs, other issues and conditions of the construction of the stairs are noted. Leading to this are the following observed.

- a) Observed issues and conditions of construction viewed and noted in items 4.1. through to item 8.1.
- b) Poor cuts of the stringers.
- c) All cut wood ends and faces are open and not treated - prone to wood rot.
- d) Open stringer ends exhibit signs of splits which are susceptible to moisture and water penetration into the wood.
- c) Tripping hazard at the top of the stairs deck edge where rise is too high and no edge nose constructed.
- d) Lack of and use of good quality fastener within the area of the stair stringer attachment.
- e) Lack of care and attention to construction detail.
- f) Noted that several of the wood cuts have left burn marks from the use of a dull electric skill saw blade (look detail).
- g) Wood stair components not stained to maintain at best integrity of the treated wood (last longer).

5.0. Conclusion Opinion:

After viewing all areas of the stairs, it is very apparent that the quality of workmanship is very poor by today's building standards and practices for the design and construction of exterior stairs, that the stairs were constructed in a handyman like type fashion and not completed and finished with a realistic acceptable professional manner and/or exceed today's building standards, practices and code requirements.

6.0. Recommendations:

In view of the present conditions and issues of the stairs and related components, recommend to act upon one or more of the following.

- 6.1. Securely board up both the top and bottom entry points of the stairs so that no person can use them and do nothing further.
- 6.2. Obtain the previous contractor that had constructed the stairs to remove the present stairs and design and construct new stairs that meet today's building standards, practices and code requirements.
- 6.3. Obtain a new professional contractor to remove the present stairs and design and construct new stairs that meet today's building standards, practices and code requirements.
- 6.4. Homeowner remove the present stairs and design and construct new stairs that meet today's building standards, practices and code requirements and when the stairs are completed, obtain the professional services of an independent building inspector to evaluate the construction of the stairs.

7.0. Reference Information:

- 7.1. British Columbia Building Code 2006.
- 7.2. National Building Code of Canada 2005.
- 7.3. Alberta Building Code.
- 7.4. Prescriptive Residential Wood Deck Construction Guide Based on the 2006 International Residential Code.
- 7.5. North American Deck And Railing Association. (www.nadra.org).
- 7.6. Decks.com. (www.decks.com).
- 7.7. InspectAPedia. (www.inspectapedia.com/BestPractices/Deck_Stairs.htm).
- 7.8. How To Build A Deck 5 - Steps & Stairs - Decks.com. (www.youtube.com/watch?v=PNeGtwO1fPw&feature=related).
- 7.9. Building Tall Stairs For A second Floor Deck: (www.hammerzone.com/archives/decks/stairs/2nd_story/straight.htm).

Thank you for obtaining my professional services. Any questions in relation to this report or other, please contact me anytime

Yours truly;

Dave Brice CHI
Owner/Inspector
PACIFIC WEST HOME INSPECTIONS
ASTTBC & BCIPI Certification #: PI0284.
BPCPA Home Inspector Licence #: 47668.

