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November 1, 1999

To: Regional Managers

From: Bill Howard
Director
Revenue Branch

Re: *Scaling Manual*, Amendment No. 2

This memo is to inform you that Amendment No. 2 of the *Scaling Manual* is effective November 1, 1999, and is now posted on the Internet.

Amendment No. 2 includes the following changes:

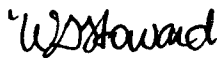
1. Table of Contents: Included to update page numbering.
2. Introduction: Updates sources for manuals and references to amendments.
3. Appendix 1A: Updates references to the *Forest Act*, *Scaling Regulation*, and *Timber Marking and Transportation Regulation*.
4. Chapter 6: Includes interior collar thickness change to 7.5 rads, reinstatement of charred wood contraindicator, and the use of average diameter for interior undersize grade.
5. Appendix 7A: References to Julian calendar removed.
6. Appendix 7B: Standard for compiling log and summary volumes is corrected.
7. Chapter 8: Correction to Round Piece Sampling method to include minimum requirements for sampling.
8. Chapter 11: References to the *Forest Act* and release of check scale data are updated.



For Internet access, the entire *Scaling Manual*, along with the above amendment, is located at: <http://www.for.gov.bc.ca/revenue/manuals/scaling/Contents.htm>, and may be printed from there. For your convenience, all changes appear in red text. Please check out Revenue Branch's "What's New" page for upcoming amendments and new publication information at: <http://www.for.gov.bc.ca/revenue/manuals/new.htm>.

The manual may be purchased through Crown Publications, 521 Fort Street, Victoria, B.C., V8W 1E7, telephone 250-386-4636. Crown Publications will advise out of service manual holders of the amendment.

Please advise all scaling staff in your region of this amendment update. If you have any questions please contact Vic Dove at 250-387-8364 or email Vic.Dove@gems8.gov.bc.ca.



Bill Howard
Director
Revenue Branch

pc: All Ministry of Forests Subscribers, *Scaling Manual*

Enclosure



<p>FOR FURTHER INFORMATION OR IF YOU HAVE A CHANGE OF ADDRESS, PLEASE CONTACT:</p> <p>Vic Dove Scaling Policy Forester</p> <p>Revenue Branch Ministry of Forests 2nd Floor, 1450 Government Street Victoria, BC V8W 3E7 Phone: 387-8364 PROFS userid: Vic.Dove@gems8.gov.bc.ca FAX: 387-5670</p>	MANUAL TITLE	
	Scaling Manual	
	AMENDMENT Amendment No. 2	ISSUE DATE November 1, 1999
	MANUAL CO-ORDINATOR	
	Judy Laton Manuals Co-ordinator	
	AUTHORIZATION (Name, Title) W. Howard Director, Revenue Branch	

Please make the following changes to your copy of the above Ministry manual.

ACTION (Remove/Insert)	(VOL.) CHAPTER-SECTION-SUBJECT TABLE OF CONTENTS	PAGE(S)	COMMENTS
INSERT	Amendments	i to iv	
REMOVE	Introduction	I-1 to I-2	
INSERT	Introduction	I-1 to I-2	
REMOVE	Table of Contents	i to xxvi	
INSERT	Table of Contents	i to xxvi	
REMOVE	Appendix 1A	1A-1 to 1A-13	
INSERT	Appendix 1A	1A-1 to 1A-18	
REMOVE	Chapter 6	6 to 15 65 to 68 121 to 122	
INSERT	Chapter 6	6 to 15 65 to 68 121 to 122	
REMOVE	Appendix 7A	7A-41, 7A-42	
INSERT	Appendix 7A	7A-41, 7A-42	
REMOVE	Appendix 7B	7B-1 to 7B-2	
INSERT	Appendix 7B	7B-1 to 7B-2	
REMOVE	Chapter 8	29 to 30	
INSERT	Chapter 8	29 to 30	

ACTION (Remove/Insert)	(VOL.) CHAPTER-SECTION-SUBJECT TABLE OF CONTENTS	PAGE(S)	COMMENTS
REMOVE	Chapter 11	3 to 4 9 to 10 23 to 26 35 to 36 39 to 40 43 to 46	
INSERT	Chapter 11	3 to 4 9 to 10 23 to 26 35 to 36 39 to 40 43 to 46	
INSERT	Memo and Transmittal		Behind Amendments Tab

Amendments

Amendment No. 1

Section	Description
Table of Contents	Updated
Chapter 5: Firmwood Scaling Procedures	Replaced the chapter
Appendix 5B: Defect Calculations	Replaced the appendix
Chapter 6: Timber Grading	Replaced the chapter
Appendix 6A: Lineal Method of Grade Deduction	Replaced the chapter
Chapter 7: Sections 7.2.1, 7.2.2, 7.3, 7.4, 7.4.1, 7.4.1.1, 7.4.1.2, 7.4.1.3, 7.4.1.4, 7.4.1.5, 7.4.2, 7.5, 7.5.1, 7.5.2	Replaced the sections
Appendix 7A	Replaced FS 244 section, FS 36 section, Record Type 2 (Segregation detail), FS 457 section, FS 416 section, Record Type P, C, U M, and L portions of FS 416 section, FS 287 section, FS 488 section, FS 482 section, FS 239 section, FS 493 section, FS 433 section, FS 649 section,
Appendix 7C	New appendix
Chapter 11: Scaling Administration	Replaced Section 11.4
Glossary	Replaced chapter

Amendment No. 2

For your convenience the current amendment updates appear in red text. All changed graphics are indicated with a red arrow ➡.

Section	Description
Introduction	Updates sources for manuals and amendments.
Appendix 1A: Synopsis of Act and Regulations Applicable to Scaling	Updates references to the <i>Forest Act</i> , <i>Scaling Regulation</i> and <i>Timber Marking & Transportation Regulation</i> .
Chapter 6: Timber Grading (Sections 6.4.2.1, 6.4.4.1.2, 6.4.4.2, and 6.6.4.1)	Includes interior collar thickness changes to 7.5 rads, reinstatement of charred wood contraindicator, and the use of average diameter for interior undersize grade.
Appendix 7A: Scale Documentation (Section 7A.1.2, #6. FS 287 Monthly Scale Return)	References to Julian calendar are removed.
Appendix 7B: Computation Standards (Section 7B.1.1)	Standard for compiling log and summary volumes is corrected.
Chapter 8: Special Forest Products (Section 8.6.1)	Correction to Round Piece Sampling method to include minimum requirements for sampling.
Chapter 11: Scaling Administration (Sections 11.2, 11.3, 11.4.7.2, 11.4.7.3, 11.5.1, 11.6.2.5.2, 11.6.3.2, 11.6.3.4, 11.6.3.5, 11.6.3.6)	References to the <i>Forest Act</i> and release of check scale data are updated.

Forest Service (FS) forms are available at the following site:

<http://www.for.gov.bc.ca/pscripts/ISB/FORMS/forms.asp>

Many multi-part or water resistant specialty forms are still available in paper form, and may be obtained from:

Judy Laton, Manuals Coordinator
E-mail: Judy.Laton@gems1.gov.bc.ca
Telephone: (250) 387-8356
Fax: (250) 387-5670

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Introduction

Under British Columbia's *Forest Act*, all timber harvested from both Crown and private land must be scaled. Timber is scaled to determine its volume and quality.

This manual documents how timber is scaled for purposes of the *Forest Act* and the *Scaling Regulation*.

Scale data is the basis for many transactions for both government and industry. To ensure scale results are reliable and mean the same thing to all users, scaling is dependent upon compliance with the standards, conventions, and procedures prescribed in this manual.

If You Need More Information

This manual was written as a reference and a working tool for government, industry, students and anyone else with an interest in scaling. With such a broad target audience, it may not provide sufficient detail to meet all your needs.

If you need clarification on any topic, we encourage you to contact your local Forest Service office.

We Need Your Comments and Suggestions

To ensure this manual is useful for you, it is important that you provide us with your comments and suggestions.

Please send them to:

Scaling Policy Forester Ministry of Forests Revenue Branch PO Box 9511, Stn Prov Govt Victoria, BC V8W 3E7
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Or, use the *Scaling Manual's* feedback form that can be found at the following Internet address:

<http://www.for.gov.bc.ca/revenue/manuals/scaling/feedback.htm>

To Obtain a *Scaling Manual*

The *Scaling Manual* is available electronically on the Internet at:

<http://www.for.gov.bc.ca/revenue/manuals/scaling/contents.htm>

For those who may still wish to purchase a hard copy of the *Scaling Manual*, it is available for a fee through:

<p>Crown Publications 521 Fort Street Victoria, BC V8W 1E7 (250) 386-4636</p>
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You can also get *Scaling Manual* information from the Crown Publications, General Publications page:

http://www.crownpub.bc.ca/cat_view.cgi/CP.02.01.40.02

Manual Amendments

Future amendments to this manual can be printed from the Internet or purchased from Crown Publications.

Check out Revenue Branch's "What's New" page for upcoming amendments and new publication information at:

<http://www.for.gov.bc.ca/revenue/manuals/new.htm>

This information can also be found in the *Scaling Manuals* Table of Contents at:

<http://www.for.gov.bc.ca/revenue/manuals/scaling/contents.htm>

Appendix 1A Synopsis of Parts 5 and 6 of the *Forest Act* and the *Scaling Regulation*

The objective of the following discussion is to acquaint users of this manual with a basic understanding of the various provisions of the *Forest Act*, *Scaling Regulation* and the *Timber Marking and Transportation Regulation*. It is not intended to provide a comprehensive discussion.

Ensure you have a current copy of the *Forest Act*, the *Timber Marking and Transportation Regulation*, and the *Scaling Regulation*. If in doubt contact Crown Publications to purchase new copies. You may also get access to the *Forest Act* and its regulations through the Ministry of Forests Website on the Internet at: <http://www.for.gov.bc.ca/tasb/legsregs/comptoc.htm>.

1A.1 The Forest Act - Part 5 - Timber Marking

While timber marking does not generally fall under their responsibilities, scalers are required to record timber marks as a part of recording scale results. As such, scalers must have a working knowledge of timber marks, scaled timber brands, and marine log brands as well as the requirements for timber marking and branding.

The authority for timber marks, scaled timber brands and marine log brands and the responsibility for their use is set under Part 5 of the *Forest Act*. The *Timber Marking and Transportation Regulation* prescribes how marks and brands are to be applied to timber. In addition, the *Timber Marking and Transportation Regulation* requires all unscaled timber to be transported only to scale sites designated by a forest officer and it prescribes documentation requirements which must accompany all timber in transport.

1A.1.1 Section 83

Under Section 83 all timber marks for the agreements listed in Section 12 of the *Forest Act* have expiry dates and the maximum duration of any given mark is five years.

Timber marks are a one to six character code that are either painted on the side or stamped on the ends of logs to identify the authority under which the timber was harvested as well as other information about the timber.

1A.1.2 Section 84 - Timber Marks and Marking Requirements

Under Section 84, timber mark holders and persons working with their consent must ensure timber is conspicuously marked in the prescribed manner prior to transport off the area of harvesting. The prescribed manner of marking is set under the *Timber Marking and Transportation Regulation*.

Under Section 84 (5) the Forest Service may issue exemptions from the prescribed method of marking and set another method and/or level of marking where it is warranted.

In addition, under policy, harvesting agreements and cutting authorities may include a standard clause requiring the licensee to erect signs at the exit point of each cut block clearly showing the timber mark applicable to that cut block.

1A.1.3 Section 85 - Timber Mark Applications

This section requires that timber marks must be applied for. In addition, this section authorizes timber marks to be cancelled if the mark holder contravenes a provision of Part 5 or 6 of the *Forest Act* or for other sufficient cause. When this action is contemplated, the timber mark holder must be given an opportunity to be heard before the mark is cancelled.

1A.1.4 Log Brands

Log Brands are applied to logs to indicate that timber has been scaled. Section 86 and 88 authorize two types of brands.

1A.1.4.1 Section 86 - Scaled Timber Brands

Under Section 86, timber that has been scaled must be marked with a scaled timber brand before being removed from the scale site. The method of marking is prescribed by the *Timber Marking and Transportation Regulation* and exemptions may be issued with conditions attached.

1A.1.4.2 Section 87 - Applications for Scaled Timber Brands

This section provides that a certificate describing a scaled timber brand and the scale site to which it applies be issued upon application. Scaled timber brands may be cancelled under subsection 87 (2).

1A.1.4.3 Section 88 - Marine Log Brands

Section 88 provides for issuance upon application of a marine log brand by the Registrar of Timber Marks. Where approved, a certificate containing a facsimile of the marine log brand is issued. Under this section, marine log brands must be unique and not resemble any other marine log brand.

1A.1.4.4 Section 89 - Marking with a Marine Log Brand

This section requires timber to be marked with a brand only after it has been marked with a timber mark and it has been scaled. Under the *Timber Marking and Transportation Regulation* the prescribed method of marking is one end of each piece by hammer indentation. When timber is in the water, Section 88 requires the Marine Log Brand to be readily discernible.

1A.1.5 Section 90 – Transfers

Under this section timber marks, scaled timber brands, or marine log brands must not be used without the consent of the holder. Use of marine log brands may not be transferred from the holder to another person without the consent of the regional manager or the district manager and without prior written notice to the Registrar of Timber Marks.

Timber marks and scaled timber brands are not transferable and, as such, changes in ownership result in timber marks and scaled timber brands being cancelled and re-issued.

1A.1.6 Section 91 – Evidence

This section provides that the certificate describing the timber mark and its holder is a legal document and can be used as evidence in court.

1A.1.7 Section 92 - Registers Must be Kept

This section simply requires the Registrar of Timber Marks to maintain a register for timber marks and marine log brands and the register must include details as outlined.

To Summarize

Timber carrying a timber mark tells you:

- the timber mark identifies the cutting authority under which the timber is harvested. This information can then be used to identify the area of origin, the identity of the markholder, and the exportability of the timber.

Timber carrying a marine log brand tells you:

- the timber has been scaled, and
- the holder of the brand owns the timber.

A marine log brand does not tell you where the timber was scaled and its use is optional.

Timber carrying a scaled timber brand tells you:

- the timber has been scaled, and
- where it was scaled.

It is not registered, it does not designate ownership and its use is mandatory unless exempted.

Synopsis of the Timber Marking and Transportation Regulation

This regulation is in place for three purposes:

1. To prescribe minimum marking standards for both scaled and unscaled timber.
2. To prescribe marking standards for timber stored in decks before it is transported.
3. To prescribe documentation requirements which must accompany all timber in transport.

Table 1A.1 provides a concise description of each section of this regulation. A fuller description in the form of an interpretative bulletin is also available through Revenue Branch.

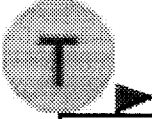
The prescribed methods and levels of marking set under the *Timber Marking and Transportation Regulation* represent the minimums required to meet several objectives:

- Control and monitor the scaling and transport of timber,
- To clearly identify the correct timber mark for all unscaled timber,
- To clearly identify the correct timber mark for the timber which is stored in decks before it is transported.
- To clearly identify timber which has been scaled, and
- To ensure all timber transport is accompanied by documentation, which describes the nature, content and destination of the transport.

Collectively, these objectives help ensure the Ministry of Forests meets its primary mandate of ensuring all timber is scaled and any revenues due to harvested timber are accurately and completely accounted for. Where the standards set under the regulation are inadequate in view of a high revenue risk (e.g., risk of theft, mismarking, log loss, mixing marks, etc.) the *Forest Act* and this regulation give the Ministry of Forests the authority to impose higher standards and/or methods.

Similarly, under some circumstances, the ministry may exempt mark holders from the standard requirements and impose lesser standards and/or other methods. These circumstances may include instances where timber is too small for conventional timber marking, standard requirements are unsafe, or standard requirements are not practical given a low level of risk or operational constraints.

Table 1A.1 Summary of Standard Requirements – Timber Marking and Transportation Regulation



Summary of Standard Requirements Timber Marking and Transportation Regulation Effective January 1, 1998			
UNSCALED TIMBER			
Section	Heading	Standard Requirement	Additional Notes
2	Scale Site Designation	All unscaled timber must be sent only to scale sites where the timber mark has been designated for scaling.	1. The place of scaling for each timber mark must be designated by the Forest Service before any transport – see your local Forest Service Office.
3	Timber Marking – stored timber	For timber stored in decks or piles or cutblock or right of way: <ul style="list-style-type: none"> ◇ 10% of logs must be hammer indented on 1 end. 	1. Under policy – the standard requirement applies where: <ul style="list-style-type: none"> ◇ accumulations are greater than 35m³ in volume, and ◇ accumulations are accessible to a truck, and ◇ there is no logging activity and equipment has been removed from the cutblock or right-of-way. 2. The Forest Service may also require deck marking where the risk of mismarking and theft warrants it. 3. The Forest Service may also exempt from deck marking and set another method of marking where warranted (usually for safety, operational constraints or size of logs).
4	Timber Marking – land transport	For all unscaled timber transported on the land: <ul style="list-style-type: none"> ◇ hammer indent 2 logs at the front and 2 at the back of each load, and ◇ paint the mark on each side of each load. 	1. Ministry may exempt markholders from standard requirement – see local Forest Service office for direction. 2. Timber marks may be marked on the sides with crayon or paint if not feasible to mark the ends – see local Forest Service office for direction. 3. The Forest Service may, under some circumstances, require a higher level of marking than the standard.
5	Timber Marking – water transport i. if timber will be dumped into the water ii. if timber is on a ferry or barge and will not be dumped into water	For unscaled timber transported in rafts, bundles or a barge where timber will be dumped into the water: <ul style="list-style-type: none"> ◇ hammer indent 1 end of each piece. For unscaled timber (on a truck or railcar or bundles on a barge) and will not be dumped into the water: <ul style="list-style-type: none"> ◇ hammer indent 2 logs at the front and 2 logs at the back of each load or bundle, and ◇ paint the mark on each side of each load. 	1. Ministry may exempt markholders from standard requirement – see local Forest Service office for direction. 2. Timber marks may be marked on the sides with crayon or paint if not feasible to mark the ends – see local Forest Service office for direction. 3. The Forest Service may, under some circumstances, require a higher level of marking than the standard.

SCALED TIMBER			
Section	Heading	Standard Requirement	Additional Notes
7	Scaled Timber Brands — land transport	For all scaled timber transported on land: <ul style="list-style-type: none"> ◇ hammer indent the scaled timber brand on 2 log ends at the front and 2 log ends at the back of every load, and ◇ paint the scaled timber brand on each side of each load. 	1. Requirements under 7, 7.1(1) and 7.1(2) may be exempted in whole or in part — see Forest Service for details.
7.1	Scaled Timber Brands — water transport	For all scaled timber where bundles will be in the water: <ul style="list-style-type: none"> ◇ 4 waterproof tags at the front and 4 waterproof tags at the back of each bundle. For all scaled timber where timber is in rafts or in loose logs on a barge dumped into the water: <ul style="list-style-type: none"> ◇ hammer indent one end of each log with the scaled timber brand. 	
9	Marine Log Brands	For all scaled timber to be marked with a marine log brand: <ul style="list-style-type: none"> ◇ hammer indent 1 end of each log. 	There are no exemptions from the standard requirement.
ALL TIMBER IN TRANSPORT			
10	Load Documentation	For all timber being transported anywhere in B.C., regardless of origin or destination: <ul style="list-style-type: none"> ◇ each transport must be accompanied by a written record of the timber being transported ◇ transporters must produce the written record if requested to do so by a forest officer ◇ the written record must be remitted and retained at the direction of the ministry. 	1. This requirement applies to all timber in transport. 2. See Section 10(2) of the regulation for information which must be included on the written record. 3. Under some circumstances this requirement may be waived.
11 & Forest Act	Offences	Contravention of requirements for: Scale Site Designation Timber Marking (scaled and unscaled), and Load Documentation are subject to ticketing and/or summary conviction.	1. See the Forest Service for details.

1A.2 The *Forest Act* - Part 6 - Timber Scaling

1A.2.1 Section 93 – Interpretation

The term "to Scale" under the *Forest Act* means:

- to determine the volume or quantity of timber, and
- to classify the quality or grade of that timber.

Timber under the *Forest Act* (Section 1) is defined to include trees, whether standing, fallen, living, dead, limbed, bucked, or peeled and for purposes of the *Scaling Regulation* includes special forest products.

1A.2.2 Section 94 - Timber to be Scaled

Section 94 sets the requirement that all timber harvested under jurisdiction of the province (both private and Crown land) must be scaled prior to manufacture or sale, or transported to a place, other than where it is required to be sent for scaling. Under this section and Section 2 of the *Timber Marking and Transportation Regulation*, the place of scaling for all timber must be designated to one or more authorized scale sites prior to transport off the area of harvesting. Scale site designation is administered on a timber mark basis and, as such, is referred to by the Ministry of Forests as Mark Site Designation (MSD).

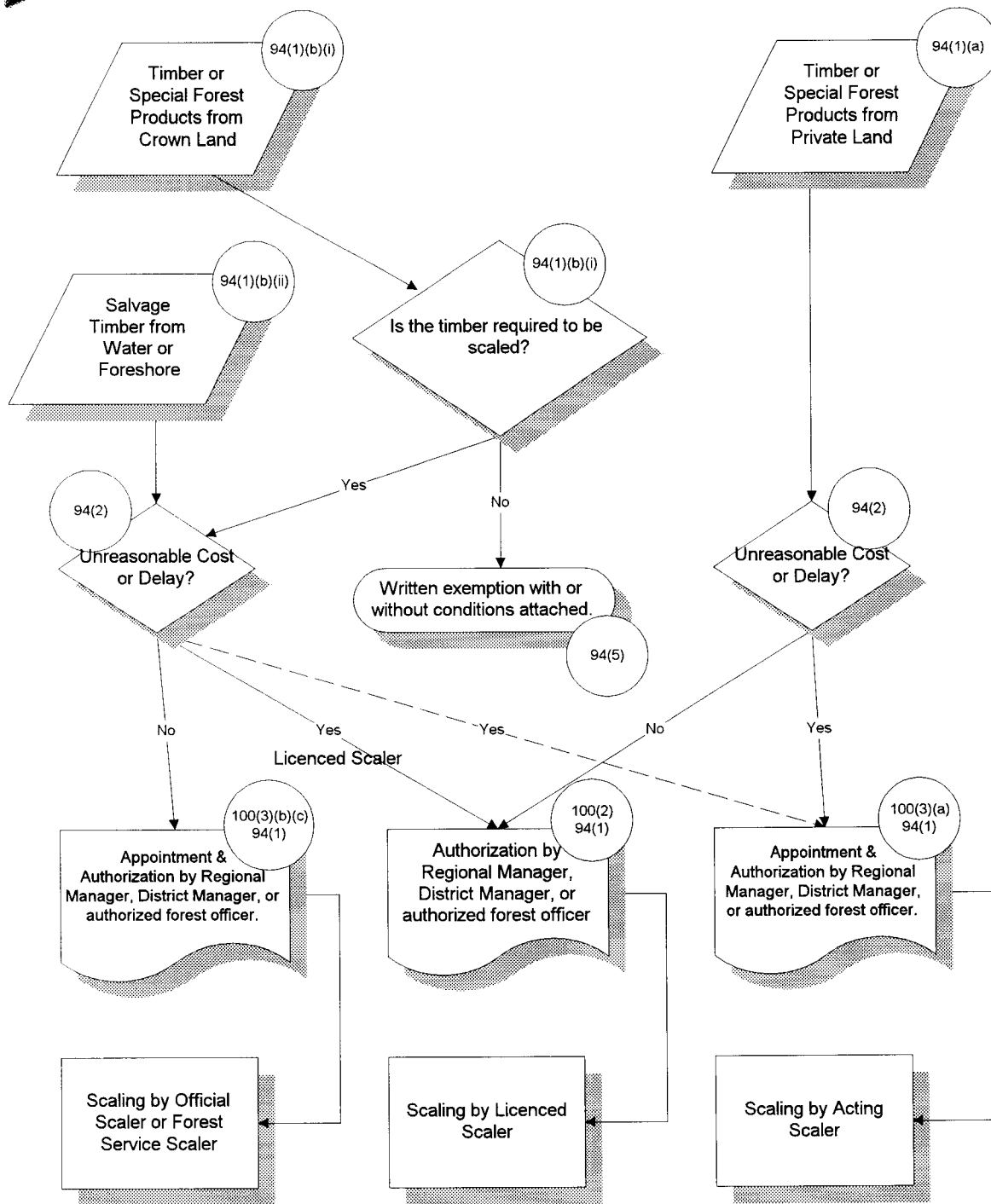


Figure 1A.1 Flow diagram outlining scaling requirements under Sections 94 and 100 of the Forest Act.

This further defines who may be authorized to scale under various circumstances. Figure A is a schematic summarizing subsections 94 (1) and 94 (2) as they relate to timber harvested on private and Crown lands.

The intent underlying subsection 94 (1) and 94 (2) is to ensure that the most competent and qualified scalers available scale Crown timber. Less demanding requirements are in place for timber cut on private lands as private timber is not subject to stumpage, and is not generally regulated for cut control purposes.

1A.2.3 Subsection 94 (3) - Scaling Special Forest Products

This subsection provides the authority to scale special forest products in product form instead of in timber form where the special forest products are manufactured on the same site where the timber was felled. Chapter 8 of this manual details special forest product descriptions and defines when special forest products may be scaled instead of timber in log form.

1A.2.4 Subsection 94 (4) - Set Aside Requirements for Check Scaling

Provided under this subsection is the requirement that the most recently scaled parcel or load of logs for each scaler at the scale site be set aside or retained at the scale site and be accessible for check scaling. The responsibility for this requirement applies to the owner of the scale site, the scale site operation, or the owner of the timber.

1A.2.5 Section 94 (5) - Exemptions from Requirements

Section 94 (5) provides the authority to the designated persons to exempt the requirements of Section 94 and attach conditions to the exemptions.

Criteria for scaling exemptions are defined under ministry scaling policy. Exemptions from the other requirements of Section 94 may be considered where ministry objectives are not compromised by the exemption.

1A.2.6 Section 95 - Scale Site Authorization

This subsection requires that timber be scaled only at scale sites that have been authorized by the named persons. Scale site authorizations must be applied for and applications may be denied as outlined in subsection 95 (3). Scale site authorizations may include conditions to ensure a complete and accurate scale.

This section requires timber to be scaled only at scale sites that have been authorized by the named ministry officials. Scale site authorizations must be applied for and applications may be denied on the grounds outlined in subsection 95 (3). Subsection 95 (4) enables the ministry to attach conditions to a scale site authorization which ensure a complete and accurate scale at that site. Similarly, authority is given to attach additional conditions, remove or alter conditions at any time.

Subsection 95 (5) enables the ministry to add, remove or alter conditions at specific sites, a type of scale site (e.g., piece, weight scale or special forest products) or at all scale sites at the same time.

For example, this authority would enable the ministry to issue a letter to all scale sites requiring compliance to a new condition (e.g., a new rounding convention, etc.).

Under Subsection 95 (6) authority is given to suspend or cancel scale site authorizations where the ministry is satisfied there has been non-compliance with subsections 95 (6) (i) (ii), and (iii), and only after the holder of the authorization has been given an opportunity to be heard.

Under subsection 95 (7), the responsibility for complying with the scale site authorization rests with the owner of the scale site, the operator of the scale site, and the holder of the scale site authorization.

The intent of Scale Site Authorization is to ensure all timber is scaled in controlled conditions that support a complete and accurate scale.

1A.2.7 Section 96 - The Metric Scale

This section carries the legislative authority for British Columbia's official scale as the British Columbia metric scale. It further requires that all persons scaling for purposes of the *Forest Act* must scale in accordance with the prescribed procedures, and must express the scale in terms of cubic metres or another unit of metric measure required by the Chief Forester in recording special forest products. The prescribed procedures for scaling are set under the *Scaling Regulation* and are further described in this manual.

Subsection 96 (3) sets the responsibility for a complete and accurate scale upon the owner of the timber, which in most instances is the mark holder.

As per Section 96 (1) of the *Forest Act* all scaling must be carried out in accordance with the procedures prescribed under the *Scaling Regulation*. These procedures are set out in several sections of this regulation.

1A.2.7.1 Time of Scaling

Section 2 of the *Scaling Regulation* requires that timber be scaled as soon as possible after it is cut. Specific standards are not prescribed so that the factors such as the method of harvesting, climatic conditions, log handling and transportation practices which impact the timing between harvesting and scaling can be recognized.

1A.2.7.2 Late Scale Invoice

Where it is determined that timber has not been scaled as soon as possible after it is cut, subsection 3 (1) authorizes the ministry to scale the timber using a field estimate. This field estimate is deemed to be an approved method of scaling under subsection 5 (1) (c) of the regulation. Being a scale under the *Forest Act*, the date of scaling for all purposes of the *Forest Act* is deemed to be the date of the field estimate.

Subsection 3 (2) enables a replacement scale to be ordered where the ministry is not satisfied with the reliability of the field estimate.

Where the ministry concludes the delay in scaling caused the volume to change or the quality to deteriorate, Section 3 (3) provides the authority that timber be scaled at the time of the field estimate, or replacement scale to reflect the volume and grade which would have applied when the timber should have been scaled (i.e., as per subsection (2)).

1A.2.7.3 Bucking at the Scale Site

Section 4 of the *Scaling Regulation* provides the necessary authority to control the bucking of logs prior to scaling. The intent of this section is not to forbid the bucking of logs prior to scaling, but rather to ensure logs are cut to improve the resultant scale. Under the section, timber must not be bucked at the scale site unless bucking has been permitted or ordered. This is often covered under conditions included in the scale site authorization.

Where timber has been bucked at the scale site prior to scaling into lengths of less than the prescribed minimums, subsection 9 (2) deems the log lengths for the purposes of grading to be 5.2 m for the Coast Schedule of Grades and 2.5 m for the Interior Schedule of Grades.

1A.2.7.4 Type of Scale

Section 5 sets out the different types of scale:

- a. by scaling each piece (piece scaling),
- b. by scaling samples, or
- c. other methods, including an estimate approved by the persons named under Section 5.

Where timber is scaled using an approved sampling method, subsection 5 (1.1) (b) of the *Scaling Regulation* sets out the legislative requirements that must be satisfied (i.e., must be scaled in accordance with an approved sampling plan which would result in enough samples to yield a volume estimate⁴ of ± 1 percent, 19 lines out of 20 for the population. Weight scaling, the main sampling procedure used in scaling, is covered under Chapters 9 and 10 of this manual.

This section requires that special forest products other than poles, pilings, building logs, and Christmas trees must be scaled by a method approved by the regional manager, district manager, or a forest officer authorized by either. Poles, pilings, and building logs must be scaled either by piece or weight scaling. Christmas trees must be scaled by classifying each tree according to species and length class, and counting the number of trees in each classification. Chapter 8 of this manual documents scaling of special forest products in detail.

1A.2.7.5 Scaling Procedures

Section 6 of the *Scaling Regulation* prescribes how a scaler is to scale timber and record scale data. This manual details these requirements.

1A.2.7.6 Timber Grading

Sections 7, 8, and 9 of the *Scaling Regulation* set out the requirements for classifying the grade of timber as required under subsection 6 (k).

Section 7 prescribes that cut from an area in which timber is appraised using a log based appraisal must be graded in accordance with the Schedule of Coast Grades. Timber cut from all other areas must be graded using the Schedule of Interior Grades.

Section 8 outlines the placement of grades in the schedule where the grade criteria match more than one grade.

Section 9 (1) defines what rounding conventions are to be applied in using the schedules of timber grades.

Section 9 (2) prescribes the disposition of grades where timber has been bucked at the scale site into lengths less than prescribed minimums (see Bucking at the Scale Site, Section 7.3).

Timber Grading is discussed in detail under Chapter 6.

1A.2.7.7 Calculation of Log Volumes

Section 10 of the *Scaling Regulation* prescribes the method and standards for calculating scaled log volumes under the British Columbia metric scale.

The basis for the BC Metric Scale is detailed in Chapter 5 of this manual and the standard for calculating volumes are contained in Appendix 7B.

1A.2.8 Section 97 - Scale Return

Subsection 97 (1) of the *Forest Act* requires the owner of the scale site, the operator of the scale site, the person whose timber is being scaled, and the person who performed the scale to complete a scale return in a form approved by the minister. The section further requires a copy of the scale return to be delivered within a prescribed time to the person whose timber is scaled and to the regional or district manager and also retain a copy at the scale site.

Subsection 11 (1) of the *Scaling Regulation* prescribes the required timing for submission of the scale return to be seven days after the end of the period stated under the scale site authorization. Subsection 11 (2) further prescribes penalties where these timing requirements are not met.

Section 12 of the *Scaling Regulation* further authorizes the regional manager to order the electronic submission of scale returns where the annual volume from the scale site exceeds 50 000 m³.

1A.2.9 Check Scales

Subsection 97 (4) of the *Forest Act* provides that where a check scale conducted under Section 94 (4) of the *Forest Act* varies from the original scale by a prescribed percentage in terms of volume or value, the check scale governs for purposes of the *Forest Act*. Section 14 of the *Scaling Regulation* sets the prescribed percentage at 3 percent.

Subsection 97 (5) of the *Forest Act* authorizes the named persons to exempt replacement of the original scale by the check scale where it is considered the original scale was performed in accordance with good scaling practices and the differences in the original scale and the check scale are attributable to the condition of the timber.

Subsection 97 (6) of the *Forest Act* makes various persons responsible for ensuring the original scale details are replaced by the check scale details where a replacement is required.

In addition, Section 13 of the *Scaling Regulation* enables the costs in attempting to conduct a check scale to be assessed against the scale site owner or operator where a check scale cannot be performed because the set aside requirement under Section 94 (4) of the *Forest Act* has not been complied with.

1A.2.10 Section 99 (3) – Second Check Scales

Subsection 99 (3) provides a formal recourse for scalers to have a second binding opinion if they do not agree with a check scale that replaced their original scale. Subsection 99 (4) requires the ministry to have a second check scale performed where it is feasible. Where a second check scale is performed, it replaces the first check scale as the basis of comparison with the original scale.

Under subsection 99 (5), if the second check scale varies in volume or value from the original scale by more than the prescribed percent (± 3 percent), the second check scale must replace the original scale. The scaler requesting the second check scale must pay the costs and expenses incurred by the ministry in conducting the second check scale.

Where the volume or value of the second check scale is between 0 and 3 percent of the original scale, the original scale is confirmed and the scaler who requested the second check scale is free of any expenses incurred by the ministry in conducting the second check scale.

The prescribed percentage of ± 3 percent is set under Section 16 of the *Scaling Regulation*.

1A.2.11 Scaling Charges, Costs and Expenses

Various fees, costs, and expenses are prescribed under Section 98 of the *Forest Act*. The only charges levied by the Crown under this section are where the Crown incurs expenses and costs in doing the scaling, preparing, and submitting the scale return. These charges are contained in a schedule as specified by the Chief Forester.

Section 98 (3) enables amounts under subsection 98 (1) and (2) to be waived if the amount is less than a prescribed amount. This minimum amount is prescribed under subsection 12.1 of the *Scaling Regulation* at \$25.00.

1A.2.12 Scaling Examinations and Appointments

Section 100 (1) of the *Forest Act* requires that a person who applies for a scaling licence to be examined by one or more scaling examiners appointed by the chief forester. Section 100 (2) requires that the scaling examination be approved by the chief forester and persons who pass the examination may be issued a scaling licence.

Section 100 (3) authorizes the appointment of acting scalers, forest service scalers, and official scalers.

Under the *Scaling Regulation*, Section 17 sets the fee for a scaling licence examination at \$50.00 and Section 18 sets the fee for appointment as an acting scaler at \$100.00 per year. Under the scaling policy the scaling licence examination does not apply to an applicant under the following conditions:

- is a Forest Service employee, or
- holds an acting scaler appointment and has paid the \$100.00 appointment fee, or
- holds a scaling licence and is taking an upgrading exam or is being re-examined under Section 101 of the *Forest Act*.

Similarly, under subsection 18, the acting scaler appointment fee may be waived if the volume scaled under the appointment will not exceed 300 m³ in a 12-month period.

Chapter 11 of this manual documents licencing standards, procedures, and related administration.

1A.2.13 Re-examination

Section 101 of the *Forest Act* provides the chief forester with the authority to require a licenced scaler to be re-examined within a specified time. Failure to pass the examination within the specified time will render the scaling licence cancelled.

1A.2.14 Suspension and Cancellation of a Scaling Licence

Section 102 (1) of the *Forest Act* provides the regional manager, or the district manager with the authority to suspend the licences of scaler's who fail to properly perform their duties. Suspensions must be for a set period of time and a notice must be served on the offending scaler advising of the suspension.

Section 102 (2) of the *Forest Act* provides the chief forester with the authority to cancel a scaling licence where the scaler fails to properly perform scaling duties. The cancellation must be in the form of a notice served on the offending scaler and the scaler must be given an opportunity to be heard before the scaling licence is cancelled.

1A.2.15 Offences and Penalties

Offences under the *Forest Act* are set out in Section 163. Offences applicable to Parts 5 and 6 of the *Forest Act* include and may be subject to summary conviction under the *Offences Act*:

84 (1)	90 (1)
84 (2)	90 (2)
84 (3)	94 (1)
84 (4)	94 (4)
84 (6)	95 (1)
86 (1)	95 (7)
86 (2)	96 (1)
86 (3.1)	97 (1)
86 (4)	97 (6)

In addition, under Section 163 of the *Forest Act*, it is an offence to:

- 163 (b) to mark timber with a marine log brand or scaled timber brand unless it is first marked with a timber mark under Part 5 and scaled under Part 6,
- 163 (c) for persons to represent that they are authorized to perform a scale under Part 6 when they are not so authorized, and
- 163 (f) to hinder, obstruct, or impede a regional manager, district manager, or forest officer or a person acting under the direction of any of them in the discharge or performance of a duty or the exercise of a power or authority under the *Forest Act*.

Contravention of several sections of the *Scaling Regulation* also constitute an offence under the *Forest Act*. These include:

- Section 2, and
- Section 4 (1) and 4 (4).

Contraventions of Section 10 (Documentation of Requirements) the *Timber Marking and Transportation Regulation* also constitute an offence under the *Forest Act*. Ticketable offences include contraventions of subsections 10 (1), 10 (3) and 10 (4).

Most offences under the *Forest Act* and *Scaling Regulation* are subject to violation tickets being issued by the ministry. These offences and applicable fines are set out in the *Violation Ticket Fines Regulation* (BC Regulation 434/90) under the *Offence Act*. These offences may also be subject to summary conviction under the *Offence Act*.

Penalties are also prescribed in the *Scaling Regulation* under Section 11 for late submission of scale data and Section 13 for not retaining timber for check scaling purposes.

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1. The minimum collar thickness specified is the actual unrounded measurement of the collar taken before trim allowance has been added to the defect.
2. For all coast species, the minimum collar or shell thickness needed in order to produce lumber is *5 rads (10 cm)*. This applies to all collars surrounding internal (heart) defects such as heart rot, pocket rot, holes, ring rot, ring shake, water shake, and star shake.
3. For all interior species, the minimum outer collar thickness is *7.5 rads (15 cm)* for heart rot, holes, and star shakes only. For pocket rot, ring rots, ring shake and water shake in these species the minimum collar thickness is *5 rads (10 cm)*.
4. Where a collar or a portion of a collar does not meet the minimum thickness requirement, the volume of the collar or portion must be included in the grade reduction. An exception is where the diameter of the defect is 20 percent or less than the diameter of the log end in which it appears. In such cases, the collar is deemed to be thick enough to cut lumber, so trim allowance is added to the defect measurement and the grade reduction is then calculated. This rule is used to prevent unreasonable down grading of smaller diameter logs with a very small core of heart rot. Only logs up to about 12 rads in diameter (with 5 rad collar requirement) or logs up to about 18 rads in diameter (with 7.5 rad collar requirement) are affected.

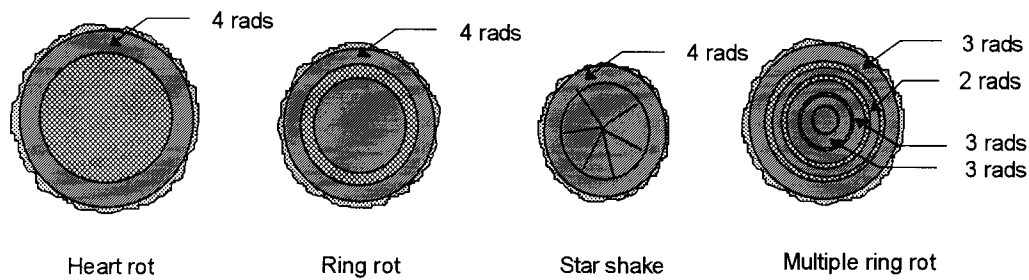
Scalers must exercise care when measuring or estimating collar thickness by taking actual, unrounded measurements of the collar. It is tempting to simply subtract the defect diameter from the recorded log diameter and divide the difference by two, but this method of averaging the collar thickness can lead to mistaken assumptions. For example:

- on logs with excessive butt flare, this method will often considerably underestimate the true collar thickness since the butt diameter has been reduced by calipering to compensate for the flare, but the defect is not. Experience has shown that defects usually follow the growth rings, so it is more reasonable to presume that if there is collar at the end of a log, there will still be collar at the point where the log was calipered, and
- on logs which have an off-centre defect, this method will not reflect the possibility that a portion of the log will or will not meet the grade requirement. For example, in Figure 6.10(1) the off-centre star shake has a portion with sufficient collar and a portion without. By averaging, a scaler may not take a grade reduction when one is available, and may take an excessive reduction when a portion of the collar actually does meet the grade requirement.

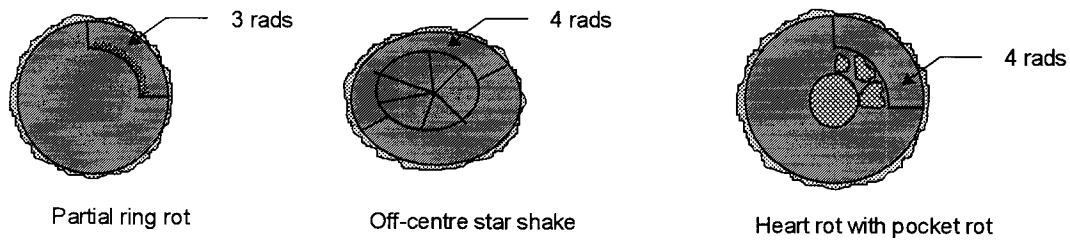
The following conventions are used to help ensure consistency in assessing collars:

- collar thickness is obtained by direct measurement of the collar with the scale stick at the log end in which the defect appears, including flared butt logs,
- if adequate collar is found on the cut face of a flared butt log, there will be adequate collar where the butt diameter was calipered,
- where a defect runs a partial length of a log, the measured collar thickness is presumed to hold true for the entire length affected by the defect, except for cone shaped defects (butt rot),
- where a defect runs the full length of a log, the collar determination made at each end is presumed to hold true for half the length of the log, and
- where a defect is located so that merely a portion of a collar is below the minimum requirement, only that portion is downgraded and added to any other grade reduction.

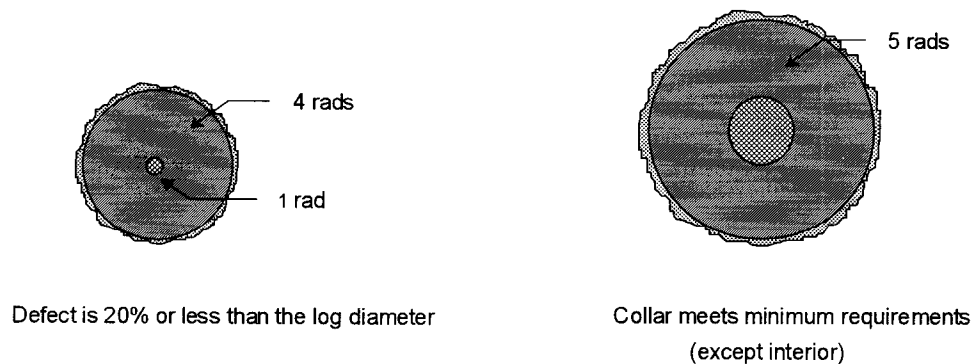
Collar thickness principles are provided in Figure 6.1, without showing trim allowance. Trim allowance is added *after* any collar assessments and is described fully in Section 6.4.2.5.



1. Examples of logs with entire collars too thin to produce lumber



2. Examples of logs with a portion of the collar too thin to produce lumber.



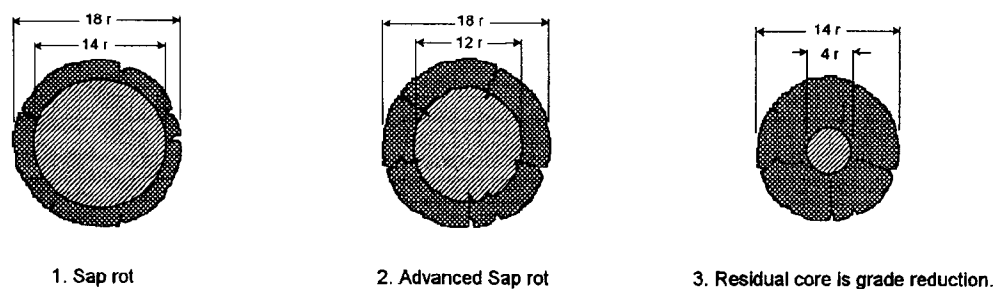
3. Examples of logs with sufficient collar to produce lumber.

(trim allowance is added to the collar surrounding the defect when calculating grade reduction).

Figure 6.1 Examples of collars around internal defects.

6.4.2.2 Determining Grade Reduction for Sound Hearts (Residual Cores)

Sound hearts inside defects such as sap rot, charred wood, ring rot and ring shake are considered suitable for lumber production if they are 5 rads (10 cm) or more in diameter. Hearts less than 5 rads are included in the grade reduction. The treatment of sap rot is illustrated in Figure 6.2. Examples of grading residual cores inside ring shake and ring rot are provided in Section 6.4.2.5 (trim allowance section).



Trim allowance is not added to sap rot but may be added to surface checking of the residual core.

Figure 6.2 Residual Cores in Sap rot.

The first example in Figure 6.2 shows the end of a log with sap rot with an outer diameter of 18 rads and a residual core diameter of 14 rads. The grade reduction is the outer portion of the log for the distance the rot travels. From the scale stick:

$$\begin{aligned}
 \text{Gross unit volume} &= \text{UV } 18 \text{ r} &= 102 \text{ dm}^3 \\
 \text{Grade reduction} &= \text{UV } 18 \text{ r} - \text{UV } 14 \text{ r} &= (102 - 62) &= 40 \text{ dm}^3 \\
 \text{\% of log which can be manufactured} &= \frac{102 - 40}{102} \times 100 &= 60.8 \text{ percent}
 \end{aligned}$$

The second example in Figure 6.2 shows relatively advanced sap rot with an outer diameter of 18 rads and a residual core diameter of 12 rads. Advanced sap rot like this often requires an additional firmwood adjustment to account for irregular rot penetration, and a further grade adjustment for checks which penetrate into the sound core.

From the scale stick:

$$\begin{aligned}
 \text{Gross unit volume} &= \text{UV } 18 \text{ r} &= 102 \text{ dm}^3 &\text{ per metre} \\
 \text{Grade reduction} &= \text{UV } 18 \text{ r} - \text{UV } 12 \text{ r} &= (102 - 45) &= 57 \text{ dm}^3 \text{ per metre} \\
 \text{\% of log which can be manufactured} &= \frac{102 - 57}{102} \times 100 &= 44.1 \text{ percent}
 \end{aligned}$$

Interior grading rules must account for these factors for administration of cut control and the utilization policy.

6.4.4.1 Dead/Dry Log Status

Administration of the annual allowable cut (AAC) in the interior requires interior scalers to identify logs cut from trees which were dead and dry when harvested. Unlike the cruiser who identifies dead trees largely by looking at the tree's foliage, the scaler's job is more complex and requires experience and good judgement.

Identifying logs cut from trees which were dead and dry when harvested is not confined to simply looking at one characteristic. Rather, scalers must look for a number of characteristics known as indicators which indicate the tree may have been dead and dry when harvested. Scalers must also look for characteristics known as contraindicators which indicate the tree was green or living when harvested.

6.4.4.1.1 Indicators

To be classified as dead/dry a log must have at least one indicator to indicate it was cut from a tree which was dead when harvested. Indicators include:

- deteriorated cambium,
- loose or shedding bark,
- sap rot (encircling log end),
- wood borers, or
- deep checks (not weather checks).

6.4.4.1.2 Contraindicators

Contraindicators are log characteristics which indicate a log was cut from a living tree. Logs showing any contraindicators are deemed to be cut from a living tree.

Green logs which have not been scaled soon after harvesting, often display bark that has curled away from the wood as a result of rapid drying of the inner layer of bark.

Green logs, when stored in decks for extended periods, often display darkened and weathered ends. Such logs often show evidence of mould and/or mildew on exposed wood surfaces.

Some species, notably pines, are resinous and continue to exude pitch for some time after harvesting. As such, pitchy log ends are a contraindicator and indicate the log was cut from a live, green tree. However, fir and larch will exude pitch long after they are dead; therefore, pitchy log ends are not a reliable contraindicator in these species.

If branches with green foliage are attached to a log, the log must be assumed to have been cut from a tree which was living when harvested.

Bark beetle larvae feed on fresh, living cambium and are a good indicator that parts of a log are still fresh. If active larvae are observed, the scaler should look carefully for any contraindicators. Larvae are white, legless, stout-bodied grubs with pale, brown heads and range from 1 mm to 7 mm, with few differences in appearance between species.

Logs cannot be classified as dead/dry if they display any of the following characteristics:

- curling bark,
- green needles,
- fresh cambium (sticky),
- mildew or mould on wood surface (except on windthrow),
- dark weathered ends (indicative of decked timber),
- pitching log ends, or
- charred wood (recent fire kill).

Mortality in trees is often a gradual process and, as such, logs may display both indicators and contraindicators. In all cases, logs displaying both indicators and contraindicators are deemed to be cut from a living tree.

Two other principles apply:

- logs subjected to prolonged decking prior to scaling and logs cut from trap trees (an insect control measure) are graded as if they were cut from living trees, and

- where fire-killed timber is incidentally harvested from undamaged or lightly fire-damaged stands, recent fire-kill will normally be taken to mean any dead standing timber that is felled within one calendar year of the fire being declared out, unless the Regional Manager orders otherwise. Where fire-killed timber is harvested from moderate to heavily damaged stands (as assessed in accordance with Appendix A.7.2 of the *Cruising Manual*) that have been appraised in accordance with Section 4.4.4 of the *Interior Appraisal Manual*, the determination of what is recent fire kill will be based upon a stand-specific decision of the Regional Manager.

Specific details of the interior dead/dry grades (grade codes 3 and 5) can be found in Sections 6.6.4 and 6.6.6.

6.4.4.2 Identifying Undersized Logs in the Interior

Cutting specifications in interior cutting authorities make reference to the diameter outside bark at stump height (DSH). This diameter is important as it determines whether or not the tree has to be utilized.

When scaling interior timber, scalers must assign an undersized grade to logs which are cut from trees which are smaller than the diameter at stump height specified in the cutting authority.

The DSH is measured outside the bark at a point 30 cm (15 rads) above the highest ground at the base of the tree. Since scalers do not see the stump, but only the butt log cut from it, the DSH is measured outside the bark at a point 15 cm (7.5 rads) from the butt end on candidate logs.

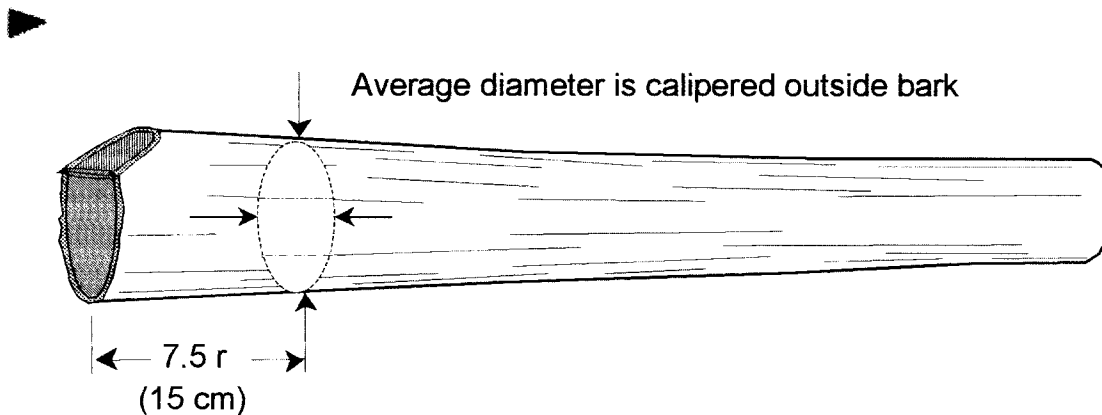
To be considered for the undersized grade:

- a log must show sufficient evidence such as an undercut, butt flare, or other butt characteristics to indicate it comprises a tree and not a top cut or long butted log, and
- the outside bark measurement (averaged) at a point 15 cm from the butt face must be less than the minimum diameter at stump height specified in the cutting authority.

If there is no evidence a log was cut from an undersized tree, it must not be graded as Grade 6.

The minimum DSH is set by the *Provincial Utilization Policy* at 15 cm (7.5 rads) for lodgepole pine, and 20 cm (10 rads) for all other species. More stringent utilization requirements may be set under the cutting authority. Utilization standards on the coast do not refer to the DSH. As such, the coast schedule of grades does not have an undersized log grade.

Where timber is cut on an area where cutting specifications are not in place, scalers are to assume a DSH of 15 cm (7.5 rads) for lodgepole pine and 20 cm (10 rads) for all other species.



6.24 Measuring diameter for interior undersize grade.

Six grades are prescribed:

Firmwood Reject	Grade Code Z
Sawlog	Grade Code (Blank)
Dead and Dry Sawlog	Grade Code 3
Lumber Reject	Grade Code 4
Dead and Dry Lumber Reject	Grade Code 5
Undersized Log Grade	Grade Code 6

6.6.4 Principles for Applying the Interior Schedule

Applying the Interior Schedule requires the scaler to:

1. Determine the percentage of the log's gross volume which is suitable for cutting merchantable lumber.
2. Identify logs cut from trees which were dead and dry when harvested.
3. Identify logs cut from undersized trees.

6.6.4.1 Assessing Lumber Recovery

Scalers must apply the principles for calculating grade reduction and assessing product quality as detailed earlier in this chapter.

1. Minimum Dimensions

To be suitable for the manufacture of lumber, logs, slabs and shells for interior grading must meet or exceed minimum dimensions. These are set as follows:

		Minimum Dimensions	
All Species		Length	Diameter/ Thickness
a. logs and log segments		2.5 m	5 rads
b. slabs and slab segments		2.5 m	7.5 rads
c. collars of firmwood around:			
i.	holes, heart rot and star shake if defect is > 20 percent of end diameter	2.5 m	7.5 rads
ii.	ring shake, water shake, ring rot and pocket rot.	2.5 m	5 rads
d. sound hearts (cores) inside external defects, including sap rot, charred wood, ring rot and ring shake.		2.5 m	5 rads

All length, diameter, and thickness measurements in the schedule of grades are the actual gross measurement (e.g., a length of 2.46 m is not rounded to 2.5 m, etc.).

6. FS 287 Monthly Scale Return

Monthly Scale Return - FS 287

- A Scaler's licence number. Enter the four character licence number.
- B Scaler's return number. Enter the three-digit return or tally number (this number should not be duplicated by the same scaler, to ensure each return has a unique identity).
- C Position 33 - 50 untitled. This field can be used to record any identification such as the FS 222, or FS 200 number. The information entered in this field is displayed on the invoice.
- D Date of return. Enter the date the scaling was completed.
- E Payable by. Enter the five digit name and address code for the party to receive the invoice. If the name and address code is unknown, leave this field blank.
- F FRS. Forest region scaled. Enter the number of the region in which the timber is scaled.
- G Total pieces. Enter the total number of pieces included in the return. If there is no piece count enter 0 (zero), as this field must be populated.
- H Scaling station number. Enter the three character scale site number issued by the ministry.
- I Place of scaling. Enter the name of the location where the timber is scaled.
- J Timber mark. Enter the timber mark left oriented.
- K Number of pieces. Enter the number of pieces for the species/grade or product segregation. If there is no piece count, enter 0 (zero), as this field must be populated.
- L Species. Enter the two character species code.
- M Grade. Enter the grade (if any) that applies to the timber.
- N Product code. Enter the special forest product code that applies to the timber. Leave blank for logs.
- O Quantity. Enter the volume right oriented and to one decimal place. If there is no volume (e.g., Christmas trees), enter 0 (zero).

Appendix 7B Scale Data Computation and Documentation Standards

1. Standard for compiling log and segregation volumes.
2. Standard for Weight Scale calculations.
3. HBS Source Document Requirements:
 - a. FS 72 - Summary of Scale, and
 - b. FS 531 - Computed Weight Scale Sample.

**Ministry of Forests
Revenue Branch**

**Version 1.1
July 1, 1999**

7B.1 Standard for Compiling Log and Segregation Volumes

7B.1.1 Calculation Standard

Steps to Compute Log Volumes		Units	Decimal	Maximum Value	Source	Example
1.	Top Radius Squared = Top Radius * Top Radius	cm ² cm cm	0 0 0	999 999 999 999	Tally Tally	5 184 72 72
2.	Top Area = 3.141592 * Top Radius Squared	cm ² cm ²	1 6 0	9 999 999.9 9.999 999 999 999	pi Step 1	16 286 3.141 592 5 184
3.	Top Area = Top Area / 10000	m ² cm ²	5 1	99.999 99 9 999 999.9	Step 2	1.628 6 162 86
4.	Butt Radius Squared = Butt Radius * Butt Radius	cm ² cm cm	0 0 0	999 999 999 999	Tally Tally	6 241 79 79
5.	Butt Area = 3.141592 * Butt Radius Squared	cm ² cm ²	1 6 0	9 999 999.9 9.999 999 999 999	pi Step 4	19 607 3.141 592 6 241
6.	Butt Area = Butt Area / 10000	m ² cm ²	5 1	99.999 99 9 999 999.9	Step 5	1.960 7 19 607
7.	Total Area = Top Area + Butt Area	m ² m ² m ²	5 5 5	99.999 99 99.999 99 99.999 99	Step 3 Step 6	3.598 3 1.628 6 1.960 7
8.	Average Area = Total Area / 2	m ² m ²	5 5	99.999 99 99.999 99	Step 7	1.794 65 3.589 3
9.	Length = Length / 10	m dm	1 0	99.9 999	Tally	6.2 62
10.	Log Volume = Average Area * Length	m ³ m ² m	3 5 1	999.999 999.999 99 99.9	Step 8 Step 9	11.127 1.794 65 6.2
11.	Log Volume Sum = Sum of Log Volumes (all logs)	m ³ m ³	3 3	99 999.999 999.999	Step 10	11.127 11.127
12.	Segregation Volume (Piece Scale) = Log Volume Sum	m ³ m ³	1 3	99 999.9 99 999.999	Step 11	11.1 11.127
13.	Segregation Volume (Weight Scale) = Log Volume Sum	m ³ m ³	2 3	99 999.99 99 999.999	Step 11	11.13 11.127

8.6.1 Round Piece Sampling Method

This method of determining the net volume of a Special Forest Product is used for scaling round small diameter special forest products such as round fence posts, round rails, grape stakes, orchard props, and sticks. Chapters 9 and 10 provide a comprehensive overview of sampling techniques used in weight scaling, and the piece sampling process is similar. Section 8.6.5 illustrates a method to determine the number of samples required for a given group or population.

The steps are:

1. Sort the product to be scaled into species, standard length classes (increments of 0.1 m), and top size (increments of one rad class). Normally, most products will be sorted into dimension classes as part of the marketing process. If this sort includes dimensions exceeding the above increments, more samples will have to be taken to achieve an accurate scale.
2. Scale a number of representative pieces using the BC Metric Scale described in Chapter 5. A sufficient quantity of pieces must be scaled to establish an average volume with confidence. For example, if all of the pieces are nearly identical in length and diameter, fewer pieces would be sampled, but as the size variation increases within a pile, more samples are required. In all cases, a minimum number of samples may be set by the ministry.
3. Determine the average net volume per piece or the "volume factor" (to five significant figures) for each bundle or pile by dividing the total volume of the scaled pieces by the piece count of the scaled pieces.
4. Count the number of pieces in the bundle or pile.
5. Multiply the number of pieces in each bundle or pile by the volume factor to determine the net cubic volume of the bundle or pile.

8.6.1.1 Calculation of the Piece Sampling Method

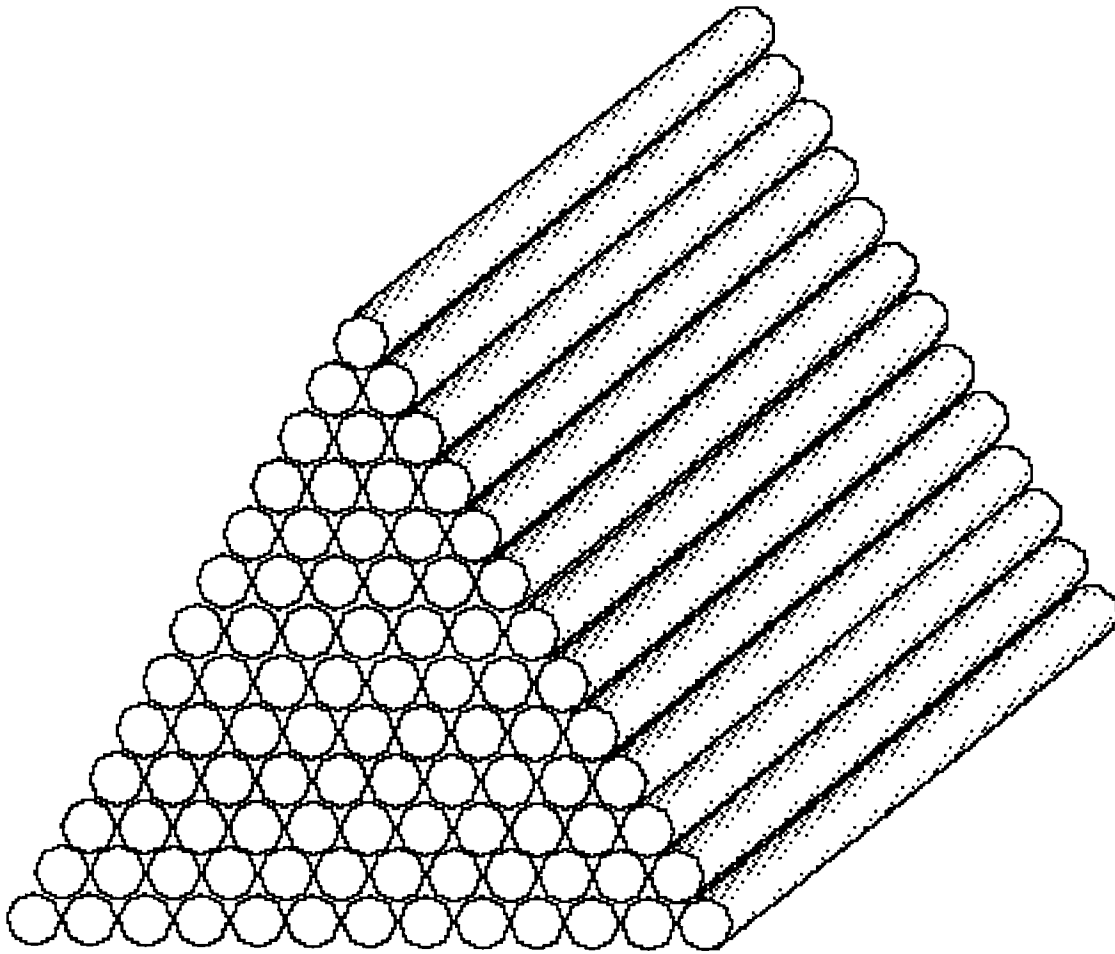


Figure 8.2 A pile of posts sorted to size classes and ready for sampling.

11.2 Designating the Place of Scale

Under the *Forest Act* and the *Timber Marking and Transportation Regulation*, before timber can be transported from its area of harvesting, the place of scaling (for each timber mark) must be designated to one or more authorized scale sites.

The administrative process of determining the place(s) where timber can be taken to be scaled is commonly referred to as "mark/site designation" (MSD).

Mark/site designation is an essential administrative process to satisfy the requirement that the scaling and transport of all timber take place in an orderly and controlled manner.

11.2.1 Applicant's Responsibilities

To transport timber off any Crown or private land you must first obtain:

1. A timber mark certificate, and
2. A mark/site designation letter.

Chapter 2 of this manual describes timber marks and marking requirements. To obtain a scale site designation letter, contact the local Ministry of Forests office and complete a written application. To apply for a mark/site designation you must be either the licence holder in the case of Crown timber, or the landowner in the case of private timber. Other persons may obtain a mark site designation only when the licence or landowner gives them written authorization to act on their behalf. Figure 11.1 is an example of an application form. This form may vary by region or district, and may be part of a more comprehensive form.

The mark/site designation letter authorizes the transport of timber to one or more authorized scale sites and may contain conditions concerning the transport or scaling at that site.

Transport of timber without a mark/site designation or to a location other than those approved is in contravention of the *Forest Act* and may result in seizure, penalties, and/or summary conviction.

APPLICATION FOR MARK SITE DESIGNATION

Prior to transportation of unscaled timber from the area of origin this form must be completed and signed by an authorized company official and delivered to the District Manager. Once signed as approved by the District Manager or the Scaling Supervisor this document will serve to

1. designate the place of scale pursuant to 73(1) of the Forest Act and Section 3(1) and (2) of the Scaling Regulations.
2. authorize the place(s) of scale for the timber mark.
3. authorize Scaling Company etc. for this site.

Timber Mark _____ /Mark Holder _____ /Payable by _____

Description of Timber _____

Trucker _____

Logging Company _____

Location of
Timber _____

Estimate No. of Truck Loads _____

Date of Transporting From _____ / _____ 19 _____ To _____ / _____ 19 _____
M D Y M D Y

Place of Scale _____

Scaling Company _____

Signature _____ / _____

Approved by _____

Position _____

District Manager

or

Mailing Address _____

Scaling Supervisor

Phone: _____ Fax: _____

Other Requirements: _____

Figure 11.1 Example of an application for a mark site designation.

11.3 Scale Site Authorization

The *Forest Act* and Ministry Scaling Policy, require owners and/or operators of a scale site to acquire a written scale site authorizations from the ministry prior commencing any scaling at that site. Failure to comply with this requirement is an offence under the *Forest Act*. The *Forest Act* also empowers the ministry to attach conditions to the scale site authorization to ensure a complete and accurate scale.

Scale site authorization helps ensure:

- timber is scaled in an orderly and systematic manner,
- data are correctly captured and submitted to the ministry, and
- all ministry requirements are clearly defined and understood by all persons on the scale site.

11.3.1 Responsibilities

11.3.1.1 Applicants Responsibilities

The owner and/or operator of the proposed operation must apply to the district manager for a scale site authorization. The application must be in writing and include:

- applicant's full name (individual, company, etc.),
- applicant's client number,
- applicant's address and phone number,
- description of the proposed site's location (may need a map or sketch),
- proposed products to be scaled and scaling method,
- period of operation,
- expected volume to be scaled (in total if a short-term site, or annually if a longer-term site), and
- if the plan is to install a weigh scale, the application must include a sketch of the scale's location in relation to the scale site yard, a description of the scale house accommodation, the type and size of the weigh scale to be installed, and the proposed computer hardware and software.

Figure 11.3 shows an example application for a scale site authorization.

The applicant may be required to sign a statement confirming the authorization has been read and conditions understood, before it will be issued.

The percentage difference of the candidate's net volume from the master scale net volume is calculated. Marks are allocated as follows:

Difference %	Mark
0.0 to 3.0	$100 - (\% \text{ difference} \times 3.333)$
Over 3.0 to 5.0	$90 - ((\% \text{ difference} - 3) \times 10)$
Over 5.0 to 8.0	$70 - ((\% \text{ difference} - 5) \times 23.333)$

The allocation of marks resulting from the above formulae is graphically demonstrated in the following table:

Difference %	Mark	Difference %	Mark
0.5	98	4.5	75
1.0	97	5.0	70
1.5	95	5.5	58
2.0	93	6.0	47
2.5	92	6.5	35
3.0	90	7.0	23
3.5	85	7.5	12
4.0	80	8.0	00

The mark is multiplied by 0.3 before being included in the total mark for the examination.

c. Grading and Accuracy

From the 40 marks allotted to this category, 1.0 mark is deducted for each incorrect species and each incorrect grade.

A further 0.5 of a mark is deducted for each incorrect gross length, gross radius out by more than one radius class, incorrectly entered half volume, and each type of procedural error made in recording the scale details.

The mark remaining after the deductions is added to the total mark for the examination.

11.4.6 The Administration of Scaling Licences

11.4.6.1 Invigilating Scaling Examinations

Both the written and practical parts of the examination are supervised by examiners who ensure each candidate receives no assistance from another person or from written notes. Candidates found to be receiving assistance or using notes will be disqualified and receive an automatic fail.

11.4.6.2 Marking Requirements

Examinations are to be marked by an examiner who must allocate marks in accordance with the mark distribution as described. All examinations are to be marked twice by different people to minimize errors. The examination papers of successful candidates are forwarded to Victoria for review and confirmation of results. At the same time, the examiner must ensure the names of successful candidates are entered on the corporate client record.

11.4.6.3 Issuance of Scaling Licences

Upon confirmation, the names of successful candidates are entered on the Scaling and Administrative Control System (SCS). This system assigns a licence number in accordance to licence type and issues the scaling licence. The examination papers of successful applicants are sent back to the regional scaling manager for retention.

11.4.6.4 Review by Unsuccessful Students

The pass rate on scaling examinations is frequently less than 50 percent. Scaling by its nature requires not only an understanding of theory, but also requires manual dexterity coupled with sound judgement. The most frequent cause of failure is insufficient time spent observing and scaling logs.

Any student taking a scaling examination is entitled to review the exam with a scaling examiner. Failing students should have a clear understanding where they went wrong before attempting the examination again.

11.4.7 Other Examination and Endorsements

11.4.7.1 Scaling Endorsements

As scaling serves the needs of various users, it must be responsive to often changing needs. To ensure all scalers are current and able to meet these needs, it is periodically necessary to conduct additional endorsement examinations. Such endorsement examinations have included metrication in the late 1970s, interior grading in the late 1980s, coastal letter grades in the early 1980s, and major coastal grading changes in 1990.

Failure to pass an endorsement exam within a specified time period will not result in termination of the scaling licence. It may, however, terminate the scalers authorization to scale or make the scaler ineligible for future authorizations until the endorsement has been achieved. Endorsement exams will be scheduled to minimize the disruption to active scalers. Where scalers are inactive and/or miss the scheduled endorsement exams, they may be required to take the licencing exam again to achieve the endorsement.

11.4.7.2 Re-examinations

In addition, the *Forest Act* empowers the Chief Forester to require a scaler to be re-examined. This provision is usually exercised where check scales or other inspections have concluded a re-examination is needed to confirm the scalers ability to meet licencing standards. Failure to pass the examination within a specified time will render the scaling licence cancelled.

11.4.7.3 Other Examinations

As the *Forest Act* authorizes the appointment of acting scalers other examinations are also administered by the ministry to ensure applicants are capable of meeting ministry requirements. These examinations are generally set and administered on a local basis under the overall guidance of the Scaling Board of Examiners.

11.4.8 Scalers Oath

Because scale data serves the needs of both buyers and sellers, as well as others, it is of utmost importance that scalers be absolutely objective in their conduct.

All scalers are required to swear and sign the following oath as part of receiving their scaling licence or being authorized or appointed to scale:

"I, _____, do solemnly swear that I will, in my capacity as a scaler, without fear, favour, or affection, and to the best of my ability and judgement, scale, record and report scale results in accordance with the *Forest Act*, applicable regulations, the Scaling Manual and other requirements set by the Ministry of Forests."

To students just obtaining a scaling licence:

Students obtaining a scaling licence should be commended for their achievement. All students, however, should understand passing the scaling examination is the first step toward becoming a scaler.

To become proficient and maintain your skills as a scaler, you need experience on the job, periodic study, and you should always be receptive to new knowledge.

Having a scaling licence does not authorize you to scale timber for purposes of the *Forest Act*. If you want to scale, you must also be appointed and/or authorized to scale. Section 11.5 documents these requirements.

11.5 Authorization and Appointments of Scalers

11.5.1 Legal Requirement for Authorization and Appointments

Anyone wishing to scale for purposes of the *Forest Act* must first be appointed and/or authorized to scale by the ministry.

Figure 1.4 in Chapter 1 details the legal and administrative requirements of the *Forest Act*.

The *Forest Act* requires that all scalers except Forest Service scalers must be authorized by the Ministry of Forests to conduct the official scale, and provides for the appointment of acting scalers, official scalers and Forest Service scalers. It also states that it is an offence for any person to represent that they are authorized to perform a scale if that person is not so authorized.

11.5.2 Administrative Reasons for Authorization and Appointments

Authorization and appointment of scalers is carried out for the following reasons:

- to ensure the public's valuable resource is scaled by the most competent scalers available,
- to ensure scalers are clearly aware of their legal obligations and responsibilities with respect to scaling, and the documentation, retention, and submission of scale data, and
- to enable the ministry to monitor scaling activity and conduct check scales by knowing who is scaling, as well as, where and when.

11.5.3 Terms of Requirements of Authorization and Appointments

Authorizations and appointments are restricted to the geographic jurisdiction of the signing official. They are also limited in duration.

To meet the objectives of ensuring a reliable and controlled scale, the *Forest Act* provides considerable administrative flexibility in scaling appointments and authorizations. In all cases, unless otherwise specified, appointments and authorizations are restricted to the geographic jurisdiction of the signing official and are limited in duration.

11.6.2.2 Conducting a Check Scale

Because check scales may result in actions affecting the scalers authorization to scale or scaling licence, it is important that they be representative of the scalers work. To achieve this it is ministry policy that check scales be conducted unannounced and at random whenever feasible. To be valid, the original scaled load must be left untouched after scaling and remain in the same position for check scaling. While the original scaler may be under various production pressures, the check scaler in setting the standard of comparison is required to scale each load with care and not be subject to any time constraints or other operational pressures.

Usually the check scale should comprise one truckload of logs. Where this is not feasible, the check scale should comprise enough logs so that meaningful conclusions can be made about the original scale.

11.6.2.3 Check Scale Frequency

The objective defined under ministry policy is to set check scale frequency by analyzing the relative revenue risk, the volume scaled, and the scalers past performance. This objective requires an objective evaluation of each scaling situation.

For example, increased check scaling frequency might be warranted where:

- the scalers experience or past performance is weak,
- the scale site conditions may not facilitate accurate scaling, or
- the values and volumes scaled at the scale site are high.

Similarly, a reduced checking frequency might be warranted where:

- values and volumes scaled at the site are low,
- only private timber is scaled, or
- scalers past performance or experience is strong.

Scaling policy may also impose specific frequency, volume, or value objectives.

11.6.2.4 Coaching

While check scaling plays an important role in assessing compliance with ministry requirements and scaling procedures, it also plays an important role in scaler development and training. Whenever feasible, the check scale should include an on-site review by the check scaler and the original scaler to share the check scale details and go over significant variances between the check scale and the original scale. This may include use of a saw or axe to confirm assumptions concerning the extent of decay or other defects. It is only through this process that inconsistencies or other sources of variance can be identified and resolved.

11.6.2.5 Division of Responsibilities

11.6.2.5.1 The Scaler

Every scaler must understand the ministry has the responsibility of ensuring that scale results are correct and ensuring scaling duties are performed correctly. To enable these to check scale to carry out these responsibilities requires the scaler to be co-operative with the check scaler by retaining at the scale site a copy of the scale details for the most recently scaled parcel or load of timber and making available any other required documentation for inspection.

At the request of the check scaler, scalers must make themselves available to discuss check scale results and where required, review check scale logs on-site.

11.6.2.5.2 Scale Site Operator

The scale site operator is responsible for ensuring the last scaled load for each scaler is retained for check scaling. To this end the last scaled load must be clearly marked or tagged as scaled as per the scale site authorization and wherever feasible the load should remain in exactly the same position as originally scaled. This is an integral part of ensuring reliable check scale results, and as such, several provisions in the *Forest Act* and *Scaling Regulation* address this topic.

Under the *Forest Act* the owner and operator of the scale site and the owner of the timber are responsible for ensuring the most recently scale parcel or load of logs is set aside or retained at the scale site and be accessible for check scaling. In the event of non-compliance with this requirement. The *Scaling Regulation* enables the ministry to assess its costs in attempting to conduct a check scale. In addition, contravention of this section of the *Forest Act* is an offence and subject to ticketing and/or summary conviction. Similarly, contravention may jeopardize the scale site authorization.

Figure 11.7 shows an example of a check scale comparison report produced by a handheld computer and printed at the scale site.

Release of Check Scale Data

1. Upon completion of a check scale, the check scale comparison reports and detailed log listing will always be provided to the scaler who performed the scale.
2. Check scale comparison reports and detailed log listings are available to other parties upon request, subject to provisions of the *Freedom of Information and Protection of Privacy Act*.

11.6.3.2 Replacement of the Original Scale by a Check Scale

Where the volume or value of the check scales varies by more than the prescribed 3 percent set by regulation, the *Forest Act* requires that the original scale be replaced by the check scale. The *Forest Act* also authorizes an exemption to this replacement where it is considered the original scale was conducted in accordance with good scaling practices and the differences in the original and check scale are attributable to the condition of the timber. The term 'good scaling practices' is subjective and requires an assessment of the nature, magnitude and frequency of scaling errors (both interpretative and quantitative).

For example, where timber is sound and of little butt flare an exemption to a replacement would likely not follow. On the other hand, where timber is decadent and otherwise good scaling practices were followed, an exemption to a replacement would likely be considered.

Where the scale is to be replaced by the check scale, a copy of the new scale return should be provided to the scaler, the owner of the timber and the mark holder.

The responsibility for ensuring that the scale is replaced by the check scale rests with the owner of the scale site, the operator of the scale site, the owner of the timber, and the scaler.

Non-compliance to this responsibility constitutes an offence that is subject to ticketing and/or summary conviction.

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CHECKS
Page 1

COMPARISON OF SCALE AGAINST CHECK - LOG REPORT

Parcel ID :

Company :

Scale	Site	Scir	Ret	ScaleDate	Time	G/N	Scaled By
Orig.	5G5	852A	023	94.07.13	13:19	G	TOM ZELEZNIK
Check	5G5	861A	040	94.07.13	13:11	G	E. KUSY

ORIGINAL														CHECK																		
Defects														Defects																		
-Top- -Butt- Defect														-Top- -Butt- Defect														-- Differences --				
Log#	Sp	G	Len	Top	Butt	DTM	On	In	On	In	Len	Per	Volume	Log#	Sp	G	Len	Top	Butt	DTM	On	In	On	In	Len	Per	Volume	Sp	Gr	Len	Top	Butt
0001	CE	2	100	011	012	BF3	0		4		20		0.003	0001	CE	2	100	010	012	BF3	0		5		20		0.005					1
0002	CE	2	150	010	019									0002	CE	2	150	010	019													
0003	CE	2	140	007	012	BF3	0		7		26		0.013	0003	CE	2	140	007	012	BF3	0		7		25		0.013					
0004	CE	2	110	006	012									0004	CE	2	110	006	012													
0005	CE	2	100	012	014									0005	CE	2	100	012	014													
0006	CE	2	138	008	014	BF3	0		4		12		0.002	0006	CE	2	138	008	014													
0007	CE	2	142	006	011									0007	CE	2	140	006	011													2
0008	CE	4	100	015	021	HF1	14		14		30		0.185	0008	CE	4	100	015	021	HF1	1		14		100		0.309					
0009	CE	2	100	018	021									0009	CE	2	100	018	021													
0010	CE	2	150	006	013									0010	CE	2	150	006	013													
0011	CE	2	100	010	011									0011	CE	2	100	010	011													
0012	CE	2	100	005	010									0012	CE	2	100	005	010													
0013	R	2	004	005	005									0013	R	2	004	004	005													1
0014	CE	2	100	008	014									0014	CE	2	100	008	014													
0015	CE	2	076	007	011									0015	CE	2	076	007	011													
0016	CE	4	100	010	014									0016	CE	4	100	010	012													2
0017	CE	2	100	008	015									0017	CE	2	100	008	015													
0018	CE	2	058	008	012									0018	CE	2	058	008	012													
0019	CE	2	110	008	014									0019	CE	2	110	008	014													
0020	CE	2	110	005	010									0020	CE	2	110	005	010													
0021	CE	2	100	010	012	BF3	0		7		30		0.015	0021	CE	2	100	010	013	BF3	0		8		30		0.020					-1

Summary of Differences : Number = %

--Species--	---Grade---	--Length---	----Top----	---Butt----	-Defects Volume
0 = 0.0%	0 = 0.0%	1 = 4.8%	0 = 0.0%	1 = 4.8%	0.133 = 37.8%

DEFECT CODES

A Ring Count	G Goiter	O Conk	U Sweep
B Butt Rot	H Heart Rot	P Pocket Rot	V Crook
C Star Check	I Pitch Pockets	Q Ring Shake	W Water Shake
D Straight Check	K Knots	R Ring Rot	
E Sun Check	L Hole	S Sap Rot	
F Fire Damage	M Missing Wood	T Twist	

Figure 11.7 Example of a check scale comparison report prepared at the scale site-part 3.

11.6.3.3 Update Scaler File and Records

The results of each check scale is posted to the scalers file and the scalers record or the Scale and Administrative Control System (SCS) so that each scalers performance can be tracked and monitored.

In addition to reviewing current check scale comparisons, check scales over the previous twelve months are reviewed to identify any possible bias. This shortcoming, along with any other trend or required corrective action should be noted in the check scale advisory letter.

11.6.3.4 Second Check Scale

Under the *Forest Act* a scaler whose scale is replaced by a check scale may request a second check scale if they disagree with the check scale. As such, this section provides a recourse for scalers to have a second binding opinion about a scale.

Where the scaler requests a second check scale the ministry is obligated under the regulation to perform it where it is feasible.

Where a second check scale is conducted, it becomes the basis of comparison with the original scale. Unlike a check scale where value is included in the replacement criteria, replacement of an original scale by a second check scale is dependent only upon the volume difference. If the second check scale varies from the original scale by more than the prescribed 3 percent, the second check scale must replace the original scale and the scaler who requested the second check scale must pay the costs and expenses incurred by the ministry in conducting the second check scale. Where the second check scale is between 0 and 3 percent of the original scale, the original scale is confirmed and the scaler who requested the second check scale is free of any expenses incurred by the ministry in conducting the second check scale.

11.6.3.5 Second Scales

Unlike a second check scale, which is available to a scaler who disagrees with a check scale that replaces the original scale, a second scale is available to anyone with an interest in the scale. If a second scale is undertaken, the basis for comparing the second scale with the original scale is restricted to the volume difference between the scales and value is not considered. If the second scale varies from the original scale by more than the prescribed 3 percent (high or low) the original scale is replaced by the second scale and the person requesting the second scale is free of any expenses incurred by the ministry in conducting the second scale. If the second scale confirms the original scale (i.e., the original and second scale vary between 0 and 3 percent by volume) the person requesting the second scale must pay for the costs and expenses incurred by the ministry in conducting the second scale.

When the Ministry of Forests was responsible for conducting scaling, it invoiced the person who requested the scale the costs and expenses of conducting it. When a second scale was requested the person requesting the second scale paid for the second scale. If the second scale resulted in cancellation of the original scale, a credit was issued for the costs and expenses billed for the original scale.

11.6.3.6 Suspension of a Scaling Licence

Under the *Forest Act*, the regional manager or the district manager is authorized to suspend a scaling licence where its holder fails to properly perform their duties or comply with the requirements of the *Forest Act* or applicable regulation(s).

Where this flagrant contravention of scaling requirements the inspecting forest officer should promptly recommend suspension of the scaling licence to the district manager and suspension should proceed without any warning.

Where there is no flagrant contravention of scaling requirements the scaler should receive at least one warning letter signed by the district manager prior to any suspension. When a suspension is made, it must be for a specific term of up to one year and the suspension automatically terminates all authorizations and appointments to scale. All suspensions are recorded on the scalers record as well as the harvest base system.

Where suspensions are made because the scaler lacks expertise, the scaler may be required to pass the licenced scalers examination again before being authorized or appointed to scale again.

11.6.4 Scale Site Inspections

11.6.4.1 Purpose of Scale Site Inspections

Scale site inspections are conducted by the Forest Service to assess compliance with the scale site authorization and ensure scaling conditions support an accurate and reliable scale. Where the inspection reveals contravention of Forest Service requirements, the inspection may result in an instruction letter, a suspension, or penalty as provided under the *Forest Act*.

11.6.4.2 Conducting a Scale Site Inspection

Scale site inspections are conducted at the same time as a check scale or as a separate inspection. Like check scales, these inspections are unannounced and at random whenever feasible.

Because scaling is conducted under diverse conditions, the format of the inspection varies considerably. Appendix 11.A, for example is a procedure used for inspecting a piece scale site. Figure 11.8 provides an example of a Site Inspection Report.

Another series of checks is required for weight scaling operations:

- check that the monthly return summary is balanced correctly by days and timber marks, and that the total net weight per day on the summary agrees with the total on the daily load inventory,
- check a completed daily load inventory to see that the total gross weight equals the sum of the net and tare weights,
- cross check a few weight scale slip details with the details on the daily load inventory and ensure these agree,
- review the gross, tare and net weights recorded on the daily summary for any abnormalities,
- if feasible, reweigh the most recently weighted truck to ensure weighings are the same,
- check that daily scale section tests are performed and corrective action is taken if applicable,
- check stratification calls using sample scale details where feasible,
- check the frequency and documentation of red tag loads,
- check compliance with weight scale emergency procedures if applicable, and
- check compliance with other conditions defined under the scale site authorization.