

# ASPECT

Definition: `as - pekt / 1. a position facing a particular direction  
2. appearance to the eye & mind.

## THE DEGIFS NEWSLETTER

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### THE EDITORIAL...

#### ***The Increasing Role of Professionals – Call for Discussion***

In the drive to eliminate red tape and cut costs for both industry and government, regulation changes are sure to increase reliance on professionals. There are indications that a revised, “results-based” Forest Practices Code will emphasize compliance and enforcement, rather than focus on the review and approval process. These potential changes will affect all professionals (i.e. P.Engs, P.Geos, and RPFs) working in the forest industry and the following editorial is a call for discussion among members.

Some of the key issues that warrant discussion include the following:

- is it possible to reduce costs and eliminate red tape without reducing environmental protection, or forest management objectives?
- are there any concerns with respect to an increased responsibility on qualified professionals in this apparent move away from generic “cookbook” approaches?
- should we support, or be wary of, the removal of “triggers”, such as the 60% rule for TSFAs? and if triggers are removed, then how would professional accountability be best reviewed?
- should work completed by a QRP be accepted without agency review?
- will industry bear the costs of this move towards a results-based code? and is this significant?
- do professionals understand what constitutes professional reliance and are they ready for increased professional reliance?

DEGIFS would like to hear your thoughts on the increasing role of professionals and encourages its members to take advantage of the several means of discussion available. Members are reminded that the new-improved DEGIFS website ([www.degifs.com](http://www.degifs.com)) has a discussion forum, in which members can login to read and contribute to upcoming and ongoing issues. As usual, members are also welcome to submit articles to Aspect.

*J. Clarke*

**DIVISION OF ENGINEERS AND GEOSCIENTISTS IN THE FOREST SECTOR**

## ***Managing Surface Sediments from Road Alignments in Coastal Forestry Operations***

Brian Carson, P. Geo., Carson Land Resources Management Ltd. Roberts Creek, B.C., and Michael Younie, P.Ag., P. Geo., Ministry of Water, Land & Air Protection, Surrey, B.C.

### **Introduction**

Considerable attention has been focused on mass failures caused by forest roads because of their known adverse effects on downstream fish habitat and drinking water quality. In some watersheds, surface erosion from roads can dominate sediment generation but rarely is surface erosion afforded the same attention as the more spectacular mass failures. This may be an important oversight on the part of watershed managers concerned with drinking water quality.

Under present regulations, soil erosion field assessments are required for proposed roads within community watersheds in British Columbia where soil erosion mapping has indicated a high soil erosion potential. However, to date, the government has not provided resource practitioners with a clear idea of exactly what a soil erosion field assessment is, or how it can be used to improve watershed management. The lack of clear guidance with regards to objectives, methodology or use of results has allowed the systematic assessment of surface erosion to "slip through the cracks" during the planning, construction, maintenance and deactivation of forest roads.

Recognizing this, Mike Younie, P.Geo., wrote an article for DEGIFS last year detailing his concerns (Vol. 6, No. 1). This last year, under Mike's guidance, FRBC Research funds were secured to develop a clear methodology by which road builders can assess surface erosion hazard in terms of measurable affect on downstream drinking water quality. Equally important, the research would provide a means to prioritize how a road should be built or ameliorated to minimize sediment generation within community watersheds.

### **Discussion**

With the advent of the Forest Practices Code and the concurrent push to develop high standards for forest road management, many licensees and their contractors have begun to experiment with new road

construction and management techniques that are a refinement of basic legal requirements. Many of these techniques have been found to be practical and cost effective and preserve water quality and water flow characteristics in the community watersheds. There are also road segments within some community watersheds that are still experiencing considerable surface erosion and these are generating sediment that degrade water quality.

The research being carried out under this project is focused on documenting erosion and sediment generation from forest roads from a wide range of coastal operations located in sensitive watersheds. In each case, important physical properties of the terrain and engineering properties of the road are recorded.

For each chosen road segment, an estimation is made of the magnitude of

- surface erosion that has occurred on the road,
- surface erosion that will likely occur; and,
- actual and potential sediment delivery to the stream generated from the road segment.

Estimating the amount of erosion that has occurred involves measuring sheet, rill and gully erosion on the road side-cast, road running surface, ditch-line and cutbank. Assessments of potential erosion and sedimentation explore the nature of the fine fraction of surface material, the portion of coarse rock within the different road components (road surface, cutslope, ditch line or fillslope) that will eventually armour the surface. When and how a surface will self-armour also is dependent on the slope gradient and expected concentration of upslope water. An assessment of potential erosion must also consider the ease and timing of vegetation re-establishment of bare soils.

Finally, the portion of eroded road sediment that actually reaches a creek is estimated. This is done by first reviewing historic rainfall, hydrometric, and water quality records from the watershed. Then a close look is made of sediment captured below the culvert, within the forest floor downslope of the road, and in some cases, the amount of incision into the forest floor caused by the concentrated culvert water before it reaches a stream. This provides a good initial assessment of the amount and type of sediment being transported to the creek as a result of the roads presence.

When road segments are visited during rain storms, the frequency and magnitude of discharge from a road segment is estimated, as are the frequency and magnitude of turbidity.

Where good downstream water quality data exists, the case studies go one step further. Using turbidity as a measure of sediment transport through ditches to tributaries and streams and finally to drinking water intakes within the watershed provides a rigorous assessment about cumulative effects of road networks on water quality within community watersheds.<sup>1</sup>

Estimates of eroded soil, discharge, and turbidity are accurate to within an order of magnitude. While this apparent lack of precision may seem unscientific, these estimates are appropriate to determine which management techniques should be considered for any particular road segment. Some may be eroding quite dramatically, but have no measurable impact on stream sedimentation, while other road segments may look benign but have serious impacts.

Road builders working in coastal B.C. are developing a set of tools to deal with surface road erosion and many are in common use including frequent culverting, armoured culvert outlets, armouring road ditches, hydroseeding bare soil, using coarser road surfacing materials, and installing water bars and cross ditches. Many contractors are unable to determine whether road surface erosion will occur or whether it will be important for water quality. Important road segments may be left unprotected, while other benign stretches may be over-designed. Development of a more rigorous means of determining what kind of soil conservation measures are appropriate for a specific road segment is the most notable objective of this project.

As in many other aspects of work carried out by members of DEGIFS, Professional Geoscientists must become more diligent when determining actual or potential consequences of predicted geomorphic events on water quality in community watersheds. A clear statement of predicted consequence in terms of the expected magnitude of turbidity event and its effect on a water intake would be of great value to the water purveyor. This would provide a basis to justify any

recommendations we might make related to road design, construction, maintenance and deactivation.

The results of this work will be used to support recommendations for changes in the way that sections of the Forest Practices Code are implemented.

Any comments you might have on this subject are welcome. Those interested in providing comments or finding out more about this work are invited to contact Brian Carson at [brian\\_carson@sunshine.net](mailto:brian_carson@sunshine.net) or Michael Younie at [mike.younie@gems8.gov.bc.ca](mailto:mike.younie@gems8.gov.bc.ca).



Culvert discharge 2 l/s with turbidity of 100 ntu. This represents 400 mg of sediment per second.



During same storm, creek discharge 0.2 l/s with turbidity of 1000 ntu. Immediate effect on stream (discharge 400 l/s with turbidity of 10 ntu) was to increase the turbidity by 1 ntu.

<sup>1</sup> For a number of Community Watersheds to be studied, there is good data on turbidity within ditches, at culvert outflows, at creek mouths and downstream at the intakes. For each watershed there is a fairly consistent relationship between turbidity and suspended sediment load.

**SHOULD WE CHANGE THE WAY WE  
CARRY OUT TFSAs?**

**CURRENT PRACTICE AND EXPECTATIONS**

Kevin Turner, Doug Erickson, Doug VanDine, and Peter Mitchell

**INTRODUCTION**

The above title was the theme of a DEGIFS workshop session held at the APEGBC Annual General Meeting on October 25, 2001. At the session, each of the authors made a brief presentation and then the session was opened up to questions from the audience. At the end of the session, Don Dobson, P.Eng., Chair of DEGIFS, indicated that members unable to attend the AGM would benefit from reading a summary of the four presentations. This technical note is the summary.

The four authors approached their presentations somewhat differently, in part because their roles in terrain stability field assessments (TFSAs) are quite different:

- Kevin Turner, P.Eng., is MoF Kamloops Regional Geotechnical Engineer
- Doug Erickson, A.Sc.T., is District Engineering Officer, MoF South Island Forest District
- Doug VanDine, P.Eng./P.Geo., is a geotechnical and geological engineering consultant
- Peter Mitchell, P.Eng., is Deputy Director of Professional Practice, APEGBC

A number of the comments, suggestions and recommendations that follow are repeated in more than one summary. These are significant in their commonality and as such have purposely been kept in this technical note for emphasis.

**KEVIN TURNER** presented the results of an office review of 33 TSFA reports for cutblocks and roads that were completed in the Kamloops Forest Region since March 2000. At least one TSFA was reviewed from each major licensee, and as many Qualified Registered Professionals (QRPs) as possible. The reports were provided by 12 Licensees and written by 21 different QRPs (10 PEngs, 8 PGeos, 2 PEng/PGeos and 1 Registered Professional Forester). The reports covered all 7 districts in the Kamloops Region. Five reports addressed roads, 11 addressed

cutblocks and 17 addressed roads and cutblocks. Six community watersheds and 1 woodlot were represented. The review evaluated, among other things, adherence to the *Forest Practice Code Regulations*, *Guidebooks* and professional practice issues.

Kevin will be preparing a report describing the results of his review in detail, however, Table 1 summarizes his findings.

**Table 1 Summary of Findings, Kamloops Forest Region TSFA Report Review**

Factor	Adequate	Marginally Adequate	Inadequate
Overall report quality	30%	39%	30%
Does the report assist the Licensee to manage and conserve?	63%	12%	24%
Will forestry personnel fully understand the recommendations?	64%	27%	9%

The main conclusion was that there is some very good work being done and some good reports being written. However, judging from the relatively high percentages found in the "Marginally adequate" column, there is room for improvement. The percentages of "Inadequate" reports is a cause for concern.

"Marginally adequate" reports could be improved by:

- increased consideration and discussion of background information;
- increased consideration and discussion of project details (blocks and roads);
- paying more attention to presenting/describing site information;
- more focused discussion of implications of proposed forest development (roads & cutblocks) on terrain stability;
- more focus on the sensitivity of the terrain to the way the forest resource should be managed;
- including rationale for assessment or recommendations;
- providing focused and pragmatic recommendations;

- using correct TSFA terminology (so assessment can be linked to the Regulations); and
- using correct risk terminology, especially obtaining and describing consequence values.

Reports were assessed as "Inadequate" for one or more of the following reasons:

- lack of background or technical information;
- failure to describe terrain or geological conditions;
- failure to describe, or take into account, downslope/downstream resources;
- "abbreviated" reports were prepared when risk to downslope/downstream resources was not low;
- poor technical writing or reporting;
- report was not written for a wide readership.

All TSFAs should make more use of existing background data, such as terrain geology and terrain stability maps and reports, bedrock geology, climate summaries, biogeoclimatic classifications and stream classifications.

Other suggestions for improvements include: make sure the ground is traversed enough, dig more soil pits and present the information, spend more time on the steep ground below the road or cutblock, spend more time in adjacent areas and make use of comparative analysis, make more use of conventional geotechnical engineering approaches or techniques including investigation, lab testing and interpretation, and engineering specifications. Increasing the level of construction monitoring was emphasized.

Recommendations should be clear and focused: avoid vagueness, refer to standard drawings and specifications where possible (eg cross ditches, blanket drains), provide sketches and drawings to assist the designer and road builder.

Sole practitioners should consider having draft reports peer reviewed before they are finalized. More use should be made of MoF regional and district staff. QRPs should make sure they thoroughly understand the Forest Practices Code Act, Regulations -- *Forest Road Regulation, Operating Planning Regulation and Timber Harvesting Practices Regulation*, and the Guidebooks -- *Mapping and Assessing Terrain Stability Guidebook* and the *Forest Road Engineering*

*Guidebook*. More attention should be paid to the "musts" in the regulations and guidebooks. More attention should be paid to *Timber Harvesting Practices Regulation* Sections 7(3), 8(2), and 8(4). In community watersheds, more attention should be paid to soil erosion issues.

DEGIFS should consider developing practice guidelines for carrying out TSFAs, similar to the "Terrain Stability Mapping Practices Guidelines", currently under preparation by the Terrain Stability Mapping Task Group, commissioned by DEGIFS. Such a guideline could fill in gaps in the *Mapping and Assessing Terrain Stability Guidebook*, describe expectations and clarify nuances in the regulations.

**DOUG ERICKSON** presented the results of reviews of 51 TSFAs carried out in the South Island Forest District in 2000 and up to August 2001. In 2000, the District and its Licensees entered into a "pilot program" to "fast track" Cutting Permit approvals, and extensive office and field review of random TSFAs were part of this review. In the field, the appropriateness of the TSFA recommendations were examined. Items examined included road locations, gully treatments, windfirmness, potential for yarding damage, bridges and culverts, soil erosion, and special construction zones.

Tables 2 and 3 indicate some issues and problems noted during the reviews. These tables are not complete for each licensee and do not cover all licensees in the District. "Significant concerns" do not always mean the TSFA was the cause.

These reviews revealed that Licensees are neglecting to include vital information from TSFAs in their planning process, and TSFA recommendations, particularly for road construction, are not always being followed. A possible reason for both may be that Licensees are having difficulty interpreting the information and recommendations in the TSFA reports. The TSFA recommendations may be too vague or contradictory, or may be too expensive or complicated to incorporate.

Suggestions for a QRP to prepare a usable TSFA include:

- explain in clear terms what harvesting/road construction options are available;
- provide descriptive sketches for specific construction styles;

- for specific products, provide specifications and installation guidelines;
- be clear about potential impacts and the possible risks of a particular activity; and
- provide specific criteria that can be understood by logging crews.

The South Island Forest District also hires QRP's to carry out TSFAs. From a clients viewpoint:

- discuss all harvesting and road construction options with the client;
- be available to the client for initial field work and for follow up site visits;

- ensure the TSFA report can be understood by logging crew; and
- carry out some follow-up (post-construction or post harvest) reviews of your recommendations.

In order to assure the forest industry that the service QRP's provide will continue to be a necessity, the information in TSFAs must be invaluable. Doug Erickson concluded by reminding us that the legislative requirement for TSFAs is only a small legislation change away from being an expensive luxury.

**Table 2 Year 2000 Results of South Island Forest District TSFA Review**

Licencee	# TSFAs Reviewed	# (%) Satisfactory	# with Significant Concerns	Comments
A	8	6 (75)	1	Gully identified on TSFA, not addressed in SP
B	2	2 (100)	-	
C	7	6 (86)	1	SP did not address gully identified on TSFA
D	8	6 (75)	1	SP did not address terrain report; gully confirmed in field
E	9	8 (89)	1	Extensive soil erosion occurring, post harvest, exceeds 5%
Combined	34	28 (85)	4	

136 Silviculture Prescriptions submitted

**Table 3 Year 2001 (up to August 17) Results of South Island Forest District TSFA Review**

Licencee	# TSFAs Reviewed	# (%) Satisfactory	# with Significant Concerns	Comments
A	8	6 (75)	1	SP did not address terrain report; gully identified in field
B	9	8 (89)	1	Road construction did not adhere to TSFA recommendation
C				None reviewed to date
D				None reviewed to date
E				None reviewed to date
Combined	17	14	2	

95 Silviculture Prescriptions submitted

**DOUG VANDINE** based his presentation on his experience of carrying out TSFAs and reviewing TSFAs as a senior reviewer, a Forest Practice Board auditor and a General and Technical Professional Practice Reviewer for APEGBC. He did not carry out a systematic review of TSFAs, however, it was his opinion that most (very roughly 60% to 75%) of the TSFAs that he has recently reviewed have been good. These have included TSFAs from various parts of the province. The following are some of his general observations and suggestions to help improve both the poorer TSFAs and the good ones.

In a number of instances, it does not appear that QRPs have referred to the requirements of a TSFA summarized in the *Mapping and Assessing Terrain Stability Guidebook*, or have recently reviewed the current *Forest Road Regulation, Operating Planning Regulation* and *Timber Harvesting Practices Regulation*. Everyone who carries out TSFAs should read, and regularly review, these documents.

Some specific observations and suggestions:

- QRPs should obtain and review all the Licencee's background information before going into the field. The resulting field work will be a lot more efficient and effective;
- TSFAs should not be carried out when there is snow on the ground;
- TSFAs are not mapping, and use of the 5-class terrain stability mapping system nomenclature is not sufficient;
- TSFAs should assess both existing and potential terrain stability hazards; and
- TSFAs should address all related slope stability hazards in and outside (upslope and downslope of) the block or the road.

Some TSFA reports are long, and contain a lot of information and tables that are not really relevant to study area, but bulk up report (boiler plate reports). Some are very short (one pagers) that do not describe the area of study, do not include a map, do not address potential hazards and/or consequences, and/or do not provide recommendations. Reports should be succinct and complete. Reports should describe and recommend.

Some TSFA reports do not refer to the maps and figures that are included, and/or the information is not consistent between text, maps and figures. Ensure

everything on the maps and figures is referred to in the text. A suggested sequence of TSFA report writing (and all report writing for that matter) is to:

- produce draft maps, figures and photo captions (the graphics);
- write the purpose and conclusions and recommendations;
- write everything in between so that the text logically flows from purpose to conclusions and recommendations and refers to the graphics;
- finalize the text; and
- finalize the maps, figures and photo captions.

In some TSFA reports, the conclusions and recommendations, which were discussed in field, are not always communicated clearly in the report. Write the entire TSFA so that all of the following individuals will be able to understand the report: loggers and road builders, the Licencee's representative with whom you were in the field (engineering layout person?), his/her supervisor (Division Engineer), his/her supervisor (Division Manager), MOF District Engineering Officer, MOE referral individual, Regional MOF Geomorphologist and Geotechnical Engineer, Regional MOE and DFO individuals, in-house or external review engineers/geoscientists, technical auditors, defence lawyers, Crown prosecutors, expert witnesses, judges. This is one of the challenges of writing a TSFA.

An in-house review of the TSFA report is very worthwhile both from a technical and communications view point and relates directly to APEGBC Bylaw 14(b)(2).

QRPs should not let the wishes of the Licencee override their conclusions and recommendations or technical capabilities, and should not let the budget of the Licencee dictate how much time they spend in the field. The first priority of the QRP is to do a good job.

All professionals should keep good (complete and well organized) project files. All TSFA reports, and any unbound drawings, should be signed sealed and dated.

**PETER MITCHELL's** presentation was based on his role as APEGBC staff advisor to DEGIFS and the ABCPF/APEGBC Joint Practice Board, and his role as

APEGBC staff most closely involved with Professional Practice Reviews.

From the APEGBC Professional Practice viewpoint, the major concern associated with TSFAs is related to PEngs and PGeos who are experienced in other fields of practice and then decide to expand their practice into the area of TSFAs without appropriate training and experience, usually by experience only.

There are two very good articles prepared by the APEGBC/ABC PF JPB that deal with this issue: "What it takes to be a qualified registered professional?" and "Using Teamwork to Maximize Efficiency in Terrain Stability Field Assessments". Both have been published in *Aspect* and deal with recommended experience and skill sets appropriate for those carrying out TSFAs.

Following are some recommendations made to practitioners who have under gone Professional Practice Reviews and have been found deficient in this area:

- become a member of DEGIFS to keep abreast of developments in this field of practice;
- review the *Mapping and Assessing Terrain Stability Guidebook* and carry out and report on TSFAs as recommended in the guidebook;
- attend the next scheduled TSFA Workshop; and
- review the DEGIFS publications on TSFAs as contained in the September 1997 and March 2001 issues of *Aspect* and the Discussion Paper on Professional Field Reviews in the Forest Sector published in the February 2000 issue of *Aspect*. These are also on the DEGIFS web page.

Under the Professional Practice Review program several individuals have been asked to provide proposals to address how they are going to respond to the above recommendations. Follow-up reviews are then carried out a year later, to ensure that those individuals have followed through with the commitments identified in their proposals.

Another upcoming issue in the area of professional practice is the apparent move to a "results-based" Forest Practices Code. Indications are that in a revised code, the government's role will be focused more on compliance and enforcement activities and less on the review and approval process. In such a

scenario, PEngs and PGeos will not have their reports and submissions reviewed by government employees to the extent that they are today. Thus there will be an increased reliance on the QRPs to submit complete and well written reports that address the appropriate issues in a comprehensive fashion.

## **DEGIFS ELECTION RESULTS**

Congratulations to all nominees for making the commitment to stand for election to the DEGIFS Executive for the next two years. The new elected members of the DEGIFS Executive for 2001/2002 are:

Brian Chow, P.Eng. (re-elected)  
Doug Dewar, P.Eng.  
Mike Greig, P.Eng.  
Eric McQuarrie, P.Eng.

The current Executive welcomes the new members and looks forward to working with them over the upcoming year. Those who were not successful are strongly encouraged to get involved in other areas of DEGIFS.

A hearty "thank you" is extended to the following members who are leaving the Executive after valuable contributions to DEGIFS over the past two years:

Shelley Higman, as Alternate Secretary  
Tim Smith, as Past Chair  
Mike Wise, as Workshops/AGM Coordinator

## **2000 Forest Engineering Award of Excellence**

Congratulations to Dr. Robert (Bob) Willington, R.P.F., P.Geo. on being awarded the 2000 Forest Engineering Award of Excellence. The award, which recognizes outstanding accomplishments in the field of forest engineering, is sponsored jointly by the Association of British Columbia Professional Foresters (ABC PF) and the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC).

Dr. Willington, initially spent several years in the Faculty of Forestry at UBC teaching graduate and undergraduate courses in forest hydrology and helping to establish long-term forest research installations at Jamieson Creek and Carnation Creek. He is currently

Manager and Forest Hydrologist of TimberWest's Integrated Resource Analysis Section, and has spent over 23 years demonstrating innovation and leadership in the field of forest hydrology and forest engineering.

### ***FYI- THE JOINT PRACTICE BOARD***

The Joint Practice Board (JPB) was formed between the ABCPF and APEGBC in 1995 to help to define the respective roles and areas of responsibility of Professional Foresters, Engineers and Geoscientists.

Members include:

#### APEGBC Members

Bill Grainger, P.Geo  
Mike Greig, RPF, P.Eng  
Tim Smith, P.Geo, Chair  
Doug Underhill, P.Eng, RPF  
Peter Mitchell, P.Eng (staff representative)

#### ABC PF Members

Gordon E Chipman, RPF  
Douglas S. Meske, RPF  
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## Do Not Forget!!!

LAST DATE FOR SUBMISSIONS TO ASPECT	NEWSLETTER RELEASE DATE
MAR. 8, 2002	MAR. 29, 2002
JULY 5, 2002	JULY 26, 2002
SEPT. 6, 2002	SEPT. 27, 2002
NOV. 22, 2002	DEC. 13, 2002

Electronic submissions in **Word format (only)** should be made to Bruce Thomson by the date listed above (no exceptions) (bruce.thomson@gems3.gov.bc.ca)

Refer to *Guidelines for Submission* on the website for submission requirements.

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