Aggregate Operators Best Management Practices Handbook

PART II

Chapter 5 - 4: Planning Modules
TRAFFIC MODULE - TM

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Tables and Figures

TRAFFIC MODULE - TM

Common Concerns: Aggregate Truck Traffic

Transport can be the single largest cost factor per tonne for aggregates, for both on-site hauling and off-site delivery. Haul truck operations, safety and efficiency are crucial in keeping costs per tonne down.

Residents and local governments commonly cite off-site traffic as a major concern regarding aggregate operations. Dump trucks can be noisy and dirty and their size can be intimidating. Their slow acceleration may add to congestion and, with frequent use, their weight can cause road deterioration. Unless an operation has its own fleet of trucks to deliver aggregate to off-site customers, individual truck issues are the responsibility of the trucking companies and managing local traffic is the responsibility of the local community. Nonetheless, producers can develop company traffic protocols to help manage these issues and work in conjunction with trucking companies and local governments. While on-site and off-site traffic planning can be combined in some situations (e.g., where highway trucks are loaded at the working face to transport material directly off-site), for many larger operations the issues are sufficiently distinct that planning for them can be done separately.

On-site traffic planning considers aspects of haul roads and industrial traffic, site entrance and exit design, weigh scale layout, and can help alleviate noise, dust and visual impact. On-site traffic is regulated by the Health, Safety and Reclamation Code for Mines in British Columbia. An on-site traffic plan may be a condition of the *Mines Act* permit. Operators are advised to consult with their local inspector of mines on the application of Code requirements for their individual operations. Where trucks access a provincial highway directly from an operation, a highway access permit may be required.

Off-site traffic planning can scope out concerns and suggest measures to limit impacts. Local planners will often request estimates of volumes, times and destinations of truck traffic, but traffic is often unpredictable due to seasonal variations and market demands. Traffic planning can also recommend driver protocols and can highlight measures the aggregate producer can take to reduce the impact of off-site traffic.

On-Site Traffic

Noise, Dust and Visual Impact Considerations of On-Site Traffic

On-site traffic may generate dust and noise and may detract from the landscape character of an operation. The dust, noise and visual landscape sections in the Site Layout Module in this handbook all make recommendations with respect to on-site traffic. Table TM-1 summarizes the BMPs for consideration for on-site traffic management planning.

Table TM - 1: On-site traffic BMPs to reduce dust, noise and visual impacts

BMPs* & Other Measures	Description	Dust	Noise	Visual
Speed Controls	reducing truck speeds from unregulated to: • 50kph can reduce dust by 25% • 30kph can reduce dust by 65% • 25kph can reduce dust by 80%	②		
Sheet Vehicles	• covering loads with tarps or sheets	②		
Road Surfacing*	• topping or paving high volume on-site roads with dust free material to reduce dust generation and create a smoother, quieter running surface. Dust generation from traffic may account for up to 40% of all dust generated at a gravel pit or quarry. • paving roads between washing facilities and site exits	② ②	② ②	 ②
Sweeping	• sweeping surfaced roads to reduce dust	②		
Drop Height	• reducing drop height into trucks can reduce dust generation by up to 25% for that activity, and reduce noise and energy cost to lift material	②	②	
Spray Facilities	• spraying loads in unsheeted trucks with water or stabilizer can reduce dust	②		
Wheel Washer	• installing a wheel washer will prevent mud from leaving the site, reduce dust and make the overall site and adjacent roads cleaner.	②		②
Road Sprays*	• regularly spraying roads with water or dust retardant can reduce road dust by as much as 50%	②		
Site Layout	• locating roads at the lowest possible elevation on site reduces noise transmission, dust dispersal and visual intrusion • not placing road along a ridge, or allowing it to cross ridges, as that would create a conspicuous break in the skyline • keeping roads off of ridges also reduces the visibility and spread of dust • using the lay of the land to hide roads, reduce exposure to wind and to muffle noise • locating roads down wind from sensitive neighbours reduces dust and noise migration towards those neighbours	② ② ② ②	② ② ②	② ② ②
Refuse to Overload	• overloading trucks can cause material loss on-site and off-site, which eventually becomes fugitive dust	②		
Road Maintenance	• grading and compacting road surfaces to prevent uneven running surfaces, which create both noise and dust	②	②	
Upswept Exhaust	• using upswept exhausts to avoid dust generation	②		
Dust Skirt Loaders	• applying dust skirts on overhead bin or conveyor loadout facilities for trucks can reduce dust by 75% during the loading process	②		
Protect / Screen Roads	• placing berms, trees, shrubs, or fences upwind of haul roads to reduce wind exposure and interrupt noise and sight lines	②	②	②
Strobe Back-up Alarms	• using strobe lights as an alternative to back up alarms. Request for a variance from the Code requirement for audible alarms should be sent to the Chief Inspector of Mines, cc'd to the Regional Mines Branch inspector		②	
Radios*	• using radio communications instead of horn signals		②	
Maintenance	• tightening loose and rattling hitches, etc.		②	
Non-engine Brakes*	• avoiding use of engine retarder brakes within urban areas		②	
Entrance Layout*	• staggering, off-setting or curving the site access to prevent direct views into the site			②
Loading Facilities*	• locating loading facilities to shield visibility from off site locations			②

* Some BMPs may not be included in this handbook.

Managing On-Site Aggregate Traffic

Managing on-site traffic largely involves initial organization of protocols and procedures. Initial set-up time and costs will likely be recouped through prevention of lost time and resources needed to deal with traffic concerns. An effective tool for managing on-site traffic is an on-site traffic map, which could be part of or based upon an extraction or mine development map.

Considerations for On-Site Traffic Planning:

- location of mine roads
- types and volumes of traffic (including personal transport) likely to use on-site roads
- speed limits
- noise, dust and visual impacts that may affect proximal features and facilities (e.g. residences, schools, retirement homes, hospitals)
- entrance and exit requirements, and whether access is to a highway under The *Highway Act* or to a local road
- a right-of-way hierarchy
- entrance/exit, loading facilities and mine-road layout to avoid unnecessary noise, dust and detracting views
- traffic and personnel transport protocols and procedures
- an on-site traffic map
- runaway lanes or retardation barriers on steep grades
- posting maps, routes, protocols and procedures at the entrance, office, garage, parking lot, etc.
- training on-site workers and preparing an "on-site traffic expectation handout" for contractors entering site.

Off-Site Traffic

Off-site traffic is a commonly cited concern about aggregate operations, both by residents and local governments. Table TM-2 identifies and discusses a number of these traffic concerns and suggests BMPs and other mitigation measures.

Table TM - 2: Off-site aggregate traffic concerns and mitigating BMPs and other measures

Local Traffic Concern	Description	BMPs & Other Measures
Noise	• the large engines used to power dump trucks, and their heavy-duty braking systems, are substantially louder than domestic motor vehicles, often drawing negative attention to the trucks	• Equipment Selection • driver training
Driver Behaviour	• the heavy loading, high noise levels and large size of dump trucks accentuate their movements, and may create the impression of aggressive driving • the nature of product delivery businesses, where time is money, may encourage aggressive driving behaviour	• driver training
Truck Visibility	• industrial vehicles and dump trucks are big and noticable, heightening perceptions regarding aggregate supply and delivery traffic	• Signage • turning lights
Vibration	• heavy vehicles, especially during hard braking, can cause ground vibrations which may be felt up to 250 metres away, depending upon local soil conditions and the sensitivity of local buildings (e.g., rattling china cabinets)	• driver training
Traffic Volume	• on low-volume roads, dump trucks from local aggregate operations may significantly increase local traffic • on already over-subscribed, high-volume roads, added truck traffic will aggravate existing problems • large trucks are readily noticed, and it may seem like there are more of them than there actually are	• trip timing
Dust	dust can be generated by: • *blow-off* from inside the box • *bounce-out* from rough roads or fast braking • *fall-off* from exterior box ledges from sloppy loading • *mud-fall* off from the underside of a truck onto the road	• Wheel Washer • avoiding overload • loading chutes • truck sheeting • wash trucks
Visual Impacts	• large high-sided trucks can cause obstruction or block views • away from construction sites, dump trucks can seem out of place and intrude upon a setting such as a residential area	• Berm • Fencing • hedges
Landscape Character	• large trucks can mar the perception of tranquillity and wildness	• Berm • hedges
Detachment	• residents, pedestrians, and other road users can feel separated and cut off because of the perceived difficulty of crossing a road heavily traveled by large trucks	• crossing lights • pedestrian bridges
Fear and Intimidation	• the volume, size of trucks, speed of traffic and proximity to people increases the likelihood of pedestrian and cyclist fear and intimidation • this factor is also influenced by road width, curb presence and shoulder size	• Fencing • road widths • speed reductions • shoulders • sidewalks
Highway Safety	• increases in traffic volume result in increased road safety hazards for all road users, pedestrians and residents	• Fencing • speed reductions
Road Degradation	• heavy-load traffic can damage roads, depending upon the age and grade of the pavement and construction standards	• avoiding overload • road standards • road upgrades

Managing Off-Site Aggregate Traffic

Some of the BMPs and other measures suggested in Table TM - 2 can be taken by the producer, some by the trucking companies and their drivers, and some by the road and highway authorities. Table TM - 3 lists these actions in association with the organizations or persons that would

normally undertake them. Working with the local planning authorities in advance of production will make managing specific aggregate traffic easier.

Table TM - 3: Suggested off-site truck traffic actions, by applicable organization

Producer	Trucking Company / Truck Driver	Road Authority
• Receiving, recording and acting on complaints • Avoiding overload • Spraying or covering outgoing loads • Refusing to load rogue drivers • Washing wheels • Loading with chutes to avoid spillage	• Sheeting trucks • Reducing speed • Driver training • Trip timing to avoid rush hours • Equipment selection • Washing trucks • Painting trucks with visually appealing images or colours	• Trimming roadside vegetation for visibility • Crossing lights • Signage • Signal lights • Insulating roads with acoustic fences, berms or shrubs. • Curbs • Planning for wide roads with adequate shoulders • Sidewalks • Pedestrian bridges • Upgrading roads around aggregate supply areas

Off-Site Traffic Planning Considerations:

- estimates of possible truck traffic volumes
- sensitive facilities (e.g., residences, schools, retirement homes, hospitals)
- low-ballast roads
- overgrown roadside vegetation affecting safety, visibility and pedestrians.
- preferred trucking route(s)
- reduced speed zones for aggregate traffic
- driver training and protocols
- signage and traffic control measures such as weight-activated turning lights
- enhanced pedestrian crossing aids
- roadside improvements (sidewalks, hedges or fences) and cost-sharing
- refusal to load rogue truck drivers
- avoiding overload
- wheel washers to remove dust and mud
- dust skirts on overhead loadout facilities to reduce dust generation
- preventing aggregate from landing on vehicle surfaces outside box, or sweeping off before hauling.
- covering or spraying loads to reduce blow-off.