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Audit of Life-cycle Management of Commercial Pattern Vehicles

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Acronyms and Abbreviations

ADM(Mat)	Assistant Deputy Minister (Materiel)
CA	Canadian Army
CDA	Canadian Defence Academy
CFB	Canadian Forces Base
CFSU(O)	Canadian Forces Support Unit (Ottawa)
CMP	Chief of Military Personnel
Comd	Commander
Comd CA	Commander Canadian Army
Comd RCAF	Commander Royal Canadian Air Force
Comd RCN	Commander Royal Canadian Navy
CPV	Commercial Pattern Vehicle
CRS	Chief Review Services
DCOS(Mat)	Deputy Chief of Staff (Materiel)
DGLEPM	Director General Land Equipment Program Management
DLP	Director Land Procurement
DLR	Director Land Requirements
DND	Department of National Defence
DRMIS	Defence Resource Management Information System
DSVPM	Director Support Vehicles Program Management
D Tn	Director Transportation
ECC	Equipment Configuration Code
ELE	Equipment Life Expectancy
FMS	Fleet Management System
FY	Fiscal Year
Km	Kilometre
L1	Level One
MR	Miscellaneous Requirement
MSE	Mobile Support Equipment
MSEECD	Mobile Support Equipment Establishment Change Demand
O&M	Operations and Maintenance
OPI	Office of Primary Interest
PAD	Project Approval Directive

PAG	Project Approval Guide
PE	PlannExpert
PWGSC	Public Works and Government Services Canada
RCAF	Royal Canadian Air Force
RCN	Royal Canadian Navy
RPM	Remarketing Performance Management
SAV	Staff Assistance Visit
SCH	Standard Commercial High Cost/Low Density
SCL	Standard Commercial Low Cost/High Density
SIV	Staff Inspection Visit
SMP	Standard Military Pattern
SOA	Standing Offer Agreement
TA	Transportation Authority
TB	Treasury Board
VCDS	Vice Chief of the Defence Staff
VOR	Vehicle Off Road

Results in Brief

Overall Assessment

Improvements in the governance of the devolved transportation function and life-cycle controls are necessary for more cost-effective fleet management.

The commercial pattern vehicle (CPV) fleet is employed to provide operational and administrative support[1] in the Department of National Defence (DND). As of January 2011, DND employed 11,171 CPVs with an asset value of $665 million. In addition to the costs for operations and maintenance (O&M) and personnel of $245 million[2] per year, DND spends $54 million annually to acquire new vehicles to recapitalize the CPV fleet or address any new requirements. The objective of the audit was to assess the governance, risk management, and control processes relating to the life-cycle management of the CPV fleet, including procurement, in-service management, and disposal.

Findings and Recommendations

Fleet Management Policy and Oversight. The Transportation Manual needs to be clearer with respect to roles and responsibilities and should offer practical guidance to manage the CPV fleet in the most effective manner.

While the transportation function was devolved in the 1990s to lower levels of command, the Director Transportation (D Tn) continues to have oversight roles that do not reflect the decentralization of resource management, while some roles have been devolved to an excessively low level. Given the relatively low risk associated with the recapitalization of the CPV fleet, it is appropriate that this activity remain a devolved function.

At lower levels of command, the absence of a common staff inspection visit (SIV)/staff assistance visit (SAV) format limited the oversight capacity to ensure compliance with all controls.

It is recommended that management roles, policies, and performance standards be clarified within the Transportation Manual in order to avoid duplication of effort and ensure functions are performed effectively at the most appropriate level of command. A standard SIV/SAV format should also be established for the CPV fleet.

Fleet Requirements. For each type of vehicle, years of service and usage in hours or distance are established as equipment life expectancy (ELE) guidelines. Established by the fleet technical authorities and recorded in the Fleet Management System (FMS), the ELE provides an optimal replacement/due-out date for each vehicle based on the expected usage and age of the vehicles. In general, 87 percent of the CPV fleet was utilized below the average ELE guidelines. Also, these guidelines are 58 percent higher than the DND average utilization rate. On the other hand, vehicles are being retained

[1] Roles and functions of mobile support equipment (MSE), paragraph 44, Section 3, Chapter 1 of Transportation Manual.
[2] Maintenance and petroleum, oils, and lubricants costs of $32.7 million and $16.2 million, respectively from Cost Factors Manual; personnel costs of $196 million for 1,745 military and 255 civilian drivers.

beyond their planned disposal date. The average age at disposal[3] of the standard commercial low-cost/high-density (SCL[4]) vehicles was 6.2 years, exceeding the findings of a life-cycle study conducted by Director Support Vehicles Program Management (DSVPM) in 1997 that had suggested a disposal age of 3.6 years to optimize resale value. The study also suggested an annual utilization of 23,256 kilometres (Km), which is higher than the current CPV usage[5] of 15,305 Km. The differences in age and utilization suggest that the existing ELEs do not correspond with the current utilization pattern of the DND fleet, wherein vehicles are utilized less in an average year but kept longer. There was also a large disparity in the usage of like vehicles of the same age.

It is recommended that the size and mix of base/wing CPV fleet establishments be validated to ensure vehicles are efficiently utilized and that the ELE guidelines be reassessed with input from the Level One (L1) managers.[6]

Fleet Aging. Maintenance costs are increasing in the CPV fleet, as the fleet is aging beyond ELE guidelines. Since the annual turnover rate of the fleet is only eight percent, it takes an average of 12 years to recapitalize the CPV fleet as opposed to the average ELE of 7.2 years. Partly due to the age of the fleet, the maintenance cost of 31 percent of the CPV fleet exceeded the respective annual amortization[7] by a total of $11 million[8] per year and the utilization rate of older vehicles declined. Two of the main reasons for the aging CPV fleet are the lengthy approval process and long procurement lead times for the standard commercial high-cost/low-density (SCH) fleet.

It is recommended that funds be committed for long lead-time acquisitions from the three-year forecast of the L1 business plans. Public Works and Government Services Canada (PWGSC) should be requested to put in place standing offer agreements (SOA) where appropriate for the SCH fleet. Finally, the minor projects approval process in the Project Approval Directive (PAD) should be streamlined with an interim measure of raising the L1 approval ceiling to accommodate historical cost escalation.

Information for Decision Making. Several data integrity issues were found in the major information systems used for CPV fleet management. Maintenance cost reports generated from the PlannExpert (PE) maintenance system were found to contain unreliable information. The lack of interface of the FMS with other information systems increased the chances of duplicate data entry error. Unclear user instructions and inconsistent practices have also contributed to incomplete and inconsistent data recording. FMS information on fuel consumption and the number of details for user vehicles were also found to be incomplete. Other data integrity issues included work orders not located in

[3] Comparative analysis limited to certain vehicle types: station wagon, carry-all (up to nine passengers), crew cab (one ton or less), panel van, and auto sedan.
[4] Examples of SCL vehicles include passenger vehicles with 24 passengers or below, and cargo vehicles seven tons or below.
[5] Comparative analysis on average annual usage (FMS data) and average disposal age (Remarketing Performance Management (RPM) data).
[6] L1 managers include the Assistant Deputy Ministers, commanders of the Royal Canadian Navy (RCN), Canadian Army (CA), and Royal Canadian Air Force (RCAF), and other equivalent management levels.
[7] "Optimal replacement (where the cost of depreciation meets/exceeds the cost of maintenance)," TD 161 Conducting a Life-cycle Analysis, Transportation Manual, 30 June 2010.
[8] Analysis based on the Cost Factors Manual, fiscal year (FY) 2010/11.

PE and work order service times that disagreed with the corresponding PE entry. Therefore, CPV fleet managers cannot be confident that all maintenance costs are being captured.

To improve the management of the CPV fleet, it is recommended that fleet owners and managers develop and implement an approach to improve the integrity of information used to support CPV fleet life-cycle decisions.

Note: For a more detailed list of Chief Review Services (CRS) recommendations and the management response, please refer to Annex A—Management Action Plan.

Introduction

Rationale for Audit

In accordance with the CRS Risk-Based Internal Audit Plan for FYs 2010/11 to 2012/13, CRS conducted an audit of the life-cycle management of CPV fleet. DND's CPV fleet is used to provide operational and administrative support. The fleet is divided into two categories—SCH[9] and SCL—each with different attributes that require different management guidelines. Like other capital assets, the CPV fleet must be managed effectively throughout its life-cycle. Fleet management includes all aspects of requirements definition, acquisition, disposal, buy/lease, maintenance, training, operation, and safety for the complete life-cycle of MSE. This audit was included in the CRS audit plan due to the materiality of the CPV transportation function and the limited audit coverage of this fleet in the past.

Materiality. As of January 2011, DND employed 11,171 CPVs with an asset value of $665 million. In addition to the personnel and O&M costs of $245 million a year, DND spends $54 million annually to acquire new vehicles to recapitalize the CPV fleet or address any new requirements. Most CPV acquisitions are funded by the Vote 5 Miscellaneous Requirements (MR) equipment program[10], which is allocated annually to L1 managers as part of the streamlined process for low-value capital projects up to $5 million in value.

Devolution. As part of the larger initiative aimed at delegating greater authority and increasing accountability for resource management by base commanders during the early 1990s, the acquisition and operation of the CPV fleet became an L1 responsibility. The role to manage and optimize the allocated CPV fleet was devolved to base/wing fleet managers. Based on Treasury Board (TB) guidance[11], D Tn developed the DND fleet management policy for the CPV fleet in the Transportation Manual.

Management Information Systems. Data crucial to fleet management is primarily recorded in three information systems: FMS, PE (to be replaced by the Defence Resource Management Information System (DRMIS)), and the RPM system.

Objective

The audit objective was to assess the governance, risk management, and control processes relating to the life-cycle management of the CPV fleet, including procurement, in-service management and disposal.

[9] Examples of SCH vehicles include passenger vehicles with over 24 passengers, cargo vehicles over seven tons, and fire trucks.
[10] Now known as Minor Projects, but for consistency MR will be used throughout the report. The term "MR" was used in the Project Approval Guide (PAG), which was superseded by the PAD as of September 2011.
[11] TB Policy Framework for the Management of Assets and Acquired Services (November 2006); TB Directive on Fleet Management: Light Duty Vehicles (June 2006); TB Guide to Fleet Management, Chapter 1: Light-Duty Vehicles (July 2007).

Scope

The audit scope included all CPVs held in the FMS as of 31 January 2011. Standard military pattern (SMP) vehicles were excluded as they have been subject to other capital acquisition audits. To focus on higher-value self-propelled vehicles, trailers[12] were also excluded. Figure 1 illustrates the number of vehicles held by each Environmental Chief of Staff[13] as well as other Assistant Deputy Minister equivalents (grouped as "Others"):

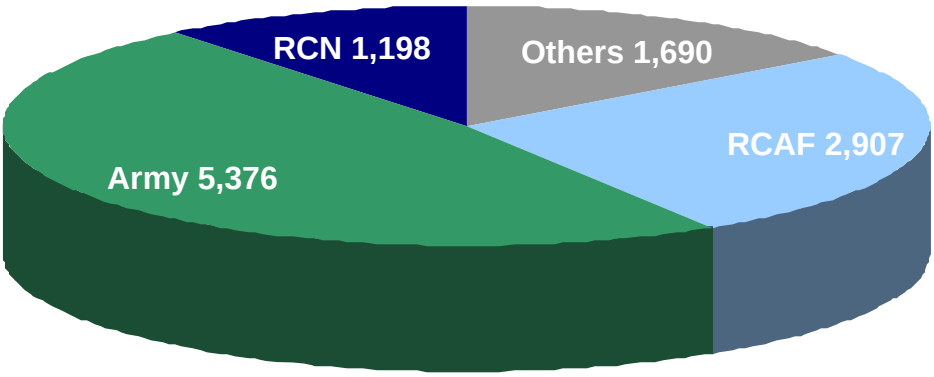

Figure 1. CPV Fleet Distribution. There are two L1 managers with significant holdings in the "Others" category. Chief of Military Personnel (CMP) has CPV holdings at Canadian Forces Base (CFB) Borden and other training/recruiting centres. The Vice Chief of the Defence Staff (VCDS) CPV fleet is managed by the Canadian Forces Support Unit (Ottawa) (CFSU(O)). The data is summarized in Table 1.

L1 Managers	Number of Vehicles
RCN	1,198
Army	5,376
RCAF	2,907
Others	1,690

Table 1. CPV Fleet Distribution.

Methodology

The following methodology was used by the audit team to gather information necessary to apply the audit criteria:

- reviewed TB policies and directives related to materiel and, fleet management, and disposal of surplus materiel, as well as DND Transportation Manual, Financial Administration Manual, PAG (superseded by the PAD in September 2011), and MSE Light Fleet Procurement Guide;
- reviewed DND L1 business plans, standard operating procedures, and guidance;
- reviewed MR supporting documentation and decisions, fleet validations, Mobile Support Equipment Establishment Change Demands (MSEECD), and Provisional Procurement Lists;

[12] 1,192 trailers (Equipment Configuration Code (ECC) first two digits 15) worth $43 million were excluded.
[13] The Environmental Chiefs of Staff are the commanders of the RCN, CA, and RCAF.

- iInterviewed key personnel of D Tn, DSVPM, Director Air Programmes, A4 Logistics, Director Maritime Logistics, Director Land Requirements, Director Land Procurement (DLP), and Director Budget;
- performed data analysis on FMS, PE, DRMIS, RPM, Equipment Data Repository, and Cost Factors Manual; and
- conducted field work at CFB Halifax, CFSU(O), CFB Borden, CFB Petawawa, and 8 Wing Trenton. The sites visited represented CPV fleet management processes that covered 24 percent of the fleet.

Criteria

The audit criteria are outlined in Annex B.

Statement of Conformance

The audit findings and conclusions contained in this report are based on sufficient and appropriate audit evidence gathered in accordance with Government of Canada internal audit policy, directives and standards using procedures that meet the Institute of Internal Auditors' *International Standards for the Professional Practice of Internal Auditing*. The opinions expressed in this report are based on conditions as they existed at the time of the audit and apply only to the entity examined.

Findings and Recommendations

Fleet Management Policy

CPV fleet policy does not clearly articulate roles, responsibilities, or standards to ensure that fleet management, a devolved function, is effectively performed by L1s.

The Transportation Manual provides specific guidelines for fleet management throughout DND. Since the devolution in 1996 to L1 managers, base/wing fleet managers were delegated increased accountability for CPV fleet management. The materiel acquisition and support function of the CPV fleet is a relatively small proportion[14] of the capital acquisition program and represents a lower risk compared to the complex weapon systems procured by Assistant Deputy Minister (Materiel) (ADM(Mat)). Therefore, it is appropriate that the CPV fleet management remain a devolved function. However, the policy concerning devolved responsibility for fleet management has not kept pace with the evolving role of local and L1 managers. The Transportation Manual also lacks clarity and practical guidance to enable the L1s to manage the CPV fleet in the most effective manner.

Roles and Responsibilities. The role of D Tn as described in the Transportation Manual is to ensure oversight and policy guidance for the employment, operation, and control of MSE. Although the Department benefits from a single coherent CPV fleet policy, the D Tn oversight role is not aligned with the resource management decentralization to L1s. As well, there are some transportation functions that should not have been devolved.

- L1s are the approval authority and funding source for new or replacement CPVs. However, the approval documentation, known as the MSEECD, still requires D Tn's final approval.
- Even if there is a sound business case to extend the life of a vehicle, L1 fleet managers have no authority to change the ELE of the vehicle in the FMS.
- Some roles have been devolved to an excessively low level. Base fleet managers are responsible for fleet optimization, which encompasses life-cycle costing, performance analysis and technical specification reviews. Such complex analysis would best be assigned at a higher level within the L1 headquarters with more resources and access to global information. L1 guidance could then be strengthened to exert beneficial influence on the size, mix, and cost behaviour across the entire CPV fleet.

Fleet Management Policies. Specific policies prescribed in the Transportation Manual to facilitate effective fleet management could be improved.

- The yearly MSE establishment review to validate the base/wing fleet's requirement was an unrealistic expectation that was not adhered to across DND. Such a labour-intensive validation could be carried out less frequently[15] given that individual vehicle requirements are reviewed prior to being replaced.

[14] CPV procurement represents only 1.6 percent of the annual capital expenditure of $3.31 billion.
[15] The RCAF has recently decided to conduct formal fleet validations with an independent review every four years.

- Base fleet validations are not required to be submitted for review and approval by the chain of command.
- The requirement for a base/wing fleet quarterly performance analysis did not specify the content of the review. Bases/wings were not aware of this requirement; therefore, no such analysis was performed. Although the need for a quarterly performance analysis is not apparent, the expected benefits should be clarified with the appropriate guidelines. Conversely, the policy requirement should be removed if such analysis is no longer necessary.

Performance Standards. There is an absence of standards in the Transportation Manual. There are two vehicle off road (VOR) rates—a normal target of seven percent and a maximum of 10 percent. Although there are suggested utilization rates for four types of SCL vehicles allocated to MSE pools, pooled vehicles account for less than 15 percent of the CPV fleet. Most of the CPV fleet consists of user vehicles that are not utilized by transportation units. Other standards that could act as performance measure targets are as follows:

- cost ratios for preventive maintenance compared to corrective maintenance for different types of fleets;
- maintenance service standards to improve inspection and routine repair efficiency;
- fleet-level fuel consumption and emission targets;
- the number of trips per year for certain types of vehicles; and
- variance targets for vehicle rotation to ensure utilization of the entire fleet.

Without properly established and monitored performance targets, accountability and improvement at all levels cannot be measured.

The transportation policy shortfalls in performance standards, devolved roles, and responsibilities have limited the efficiency of the CPV fleet management.

Recommendation

1. With input from the L1s, management roles, policies, and performance standards should be clarified within the Transportation Manual in order to avoid duplication of effort. Additionally, other fleet management frameworks should be considered to ensure the devolved transportation functions are performed effectively at the most appropriate level of command.
OPI: ADM(Mat)

Oversight of Fleet Management

Shortfalls in oversight of base-level CPV fleet management activities have resulted in a lack of procurement cost-benefit analysis, fleet size rationalization, and vehicle rotation.

L1 Fleet Management

While policy and guidance establish controls on how the CPV fleet is managed, oversight ensures compliance with the controls. Correspondingly, prompt action can be taken where significant deficiencies are encountered or improvements are needed. The following observations were made, which may be partly attributed to L1 fleet transportation authority (TA) staff shortfalls and the absence of a common DND CPV fleet SIV/SAV[16] format:

Good Practices

- Base/wing fleet managers could ground vehicles if preventive maintenance is missed.
- D Tn holds fleet management conferences or similar events at least twice a year.
- Informal networking of base/ wing fleet managers is done to share information and knowledge.

- Longer life-cycle guidance has been established by L1s for the SCL fleet than the ELE guidelines.
  - The RCN replaces its fleet every three years to maximize resale value at CFB Halifax. However, CFB Esquimalt's vehicles are retained up to 100,000 Km.
  - The CA replaces its fleet every four years or at 100,000 Km of usage, whichever is later.
  - The RCAF replaces its vehicles every five years due to a recent decrease in resale value.
- L1 fleet TAs focus on annual acquisitions rather than overall fleet performance or validation.
- Vehicle establishments in the FMS have not been updated by the bases/wings. One base visited by the audit team had not processed any MSEECD updates since 2008.
- Cost benefit analyses[17] on whether to own or rent vehicles are not being carried out at all bases/wings visited.
- Maintenance history, life-cycle data, and usage are not always considered in base fleet validations.
- Performance reports are not required as a feedback mechanism for L1 fleet TAs to effectively monitor their fleet.
- Integrity of data in the FMS is reviewed only on an ad-hoc basis, even though it is an L1 fleet TA's responsibility.
- User units only provide the monthly odometer readings and not the number of trips per vehicle.

[16] SAV/SIVs were conducted by the respective CA area or RCAF division every two to three years; the RCN did not include the CPV fleet in their latest reviews. Frequency of some L1 SIV/SAVs depends on the size of the staff. At CFB Halifax SIV/SAVs were limited to the SMP fleet.
[17] TB Policy Guide to Fleet Management, Chapter 1: Light-Duty Vehicles (July 2007) suggests rental consideration if the Kms are less than 20,000 per year.

The absence of a common SIV/SAV checklist to assess whether the transportation policy is being adhered to does not ensure that the most efficient fleet management controls are in place at each base/wing. Due to the oversight shortfalls observed at the five sites visited during the audit, assurance cannot be provided that there is sufficient information analyzed to determine the size and composition of the fleet and that the optimal disposal and replacement time for each type of vehicle is chosen. As well, without a common oversight mechanism, there is less assurance that all transportation controls for optimal CPV fleet management are being exercised across the Department.

Recommendation

2. With input from the L1s, establish a standard SIV/SAV for the CPV fleet to be used and submitted by the L1s as information to revise the policy.
OPI: ADM(Mat)

Fleet Requirements

The CPV fleet is underutilized according to the ELE usage guidelines. Fleet requirements validation for each base/wing is difficult due to incomplete vehicle holding records in the FMS.[18]

Vehicle Entitlements

Prior to acquisition, a new CPV requirement must be substantiated through an MSEECD[19] by the user unit, validated by the base/wing fleet manager, approved by the L1 TA, and recorded in the FMS. Known as an "establishment," each base/wing must substantiate a requirement to operate a certain size and mix of fleet. The audit identified 3,004 vehicles with a replacement cost[20] of $282 million that had no establishment created in the FMS. As well, there was a shortfall of 1,881 vehicles in comparison to the FMS establishment, with a potential replacement cost of $121 million. The discrepancy could be explained by incomplete FMS records and some vehicles held in-lieu of other ECCs. However, the net surplus of 1,123 vehicles (11 percent) in the FMS remains unjustified. It is unlikely that the surplus vehicles were acquired without the approval of the L1 managers, but complete MSEECD records in the FMS would provide key information for acquisition decision making at all levels. Efficient fleet management relies on the right fleet size and mix to meet the minimum essential requirements, which must be confirmed through establishment validation and fleet rationalization.

Fleet Validation

The key inputs to fleet validation are utilization surveys and cost-effectiveness studies. A utilization survey provides the kilometres travelled, the unique role of the vehicle, the area of operation, the distance, and the weather in order to determine the minimum size of the CPV fleet to support the base/unit. A cost effectiveness study considers transportation alternatives and maintenance costs to determine the optimal disposal point where the life cycle cost is minimized.

Fleet Underutilization

Vehicle utilization is one of the most critical factors dictating the attrition and acquisition timing to minimize the life-cycle cost of a vehicle. In accordance with the Transportation Manual, vehicle utilization must be recorded in the FMS at least on a monthly basis and such data must be analyzed to assess vehicle utilization patterns. As such, it is prudent that relevant performance targets be established to assess, control and monitor fleet performance on an ongoing basis.

- **ELE.** Although supplemented with guidelines developed by each L1, DND has established a set of ELEs recorded in the FMS to guide the attrition and replacement timing for the CPV fleet. The ELEs are established by fleet technical authorities in DSVPM in terms of life-cycle usage (Kms or hours) and years of life for each vehicle type.

[18] FMS holdings and establishment records as at January 2012.
[19] "Steps to the establishment of standard commercial vehicles: when received (denied or recommended) a MSEECD will be created in FMS," paragraph 4.d. TD 141 Transportation Manual, 30 June 2010.
[20] Replacement cost is the estimated cost to replace equipment according to its ECC.

- **Utilization in Accordance with ELEs.** The audit compared the odometer readings recorded in the FMS to the ELE guidelines and found that
  - 87 percent of the vehicles were underutilized and 78 percent of these underutilized vehicles had less than 50 percent of the usage prescribed by the ELE guidelines;
  - the average annual utilization rates (Kms/hours per year) for the SCL fleet are 38 percent of the ELE utilization guidelines;
  - the average annual utilization rates (Kms/hours per year) for the SCH fleet are 25 percent of the ELE utilization guidelines; and
  - 7.6 percent of the CPVs exceeded their ELE annual utilization guidelines by an average of 64 percent.

  Although the small footprint of the Canadian Forces bases/wings and the need for special-purpose MSE is acknowledged, the proportion of capital investment costs in the overall cost per kilometre for low usage vehicles can become substantial. If vehicles were acquired for a potential capacity, the unused value of the capital investment costs would amount to at least $41.9 million for the SCL fleet alone. This underutilization is offset by the extra value of those vehicles that were over-utilized by $20.5 million—a net of $21.4 million in sunk capital costs. However, the offset of over-utilized vehicles could be lower when additional maintenance cost and potential loss in resale revenue are factored in as a result of higher mileage. The discrepancy between fleet entitlements, actual fleet size and utilization is therefore not without substantial cost implications.

- **DND Average Utilization.** It is understood that some DND vehicles are acquired for specialized roles and must be available regardless of their low utilization rates. Nevertheless, the annual utilization of DND vehicles was 58 percent below the ELE usage guidelines. This significant difference may suggest that the existing ELE does not correspond to the current utilization pattern of the DND fleet size and mix. Table 2 illustrates a considerable divergence in life-cycle practices from the ELEs established in the SCL fleet life-cycle analysis conducted by DSVPM in 1997. The intention of the 1997 study was to improve the resale value and lower the maintenance costs of the fleet by reducing the life-cycle from seven to 3.6 years. However, due to low utilization, the SCL fleet is being retained for 6.2 years. The ELE should be reassessed to better support optimized life-cycle costs and the utilization pattern of the Department.

SCL[21] Life-cycle	Practices Prior to 1997 Life-cycle Analysis (Years/Km)	Recommended by 1997 Life-cycle Analysis (Years/Km)	ELE (Years/Km) April 2012	Practices[22] (Years/Km) April 2012
Average ELE Years	7	3.6	3.5	6.2
Average Life-cycle Km	152,500	83,723	109,646	94,893
Average Annual Km	21,786	23,256	31,327	15,305

Table 2. SCL Life-cycle Targets. Although it was intended to retain vehicles for only 3.6 years, SCL vehicles are still being retained for 6.2 years on average and the utilization is much lower than the ELE target.

Balanced Fleet Utilization

Keeping in mind that DND vehicles are used less than the prescribed ELE guidance, and using the DND average utilization as a benchmark, the audit determined the following:

- 39 percent of the vehicles were utilized 73 percent more than the DND average usage; and
- 52 percent of the vehicles were utilized 59 percent less than the DND average usage.

An effective rotation of low- and high-usage vehicles would improve overall cost effectiveness and fleet performance and would facilitate recapitalization planning.

Without validated CPV vehicle establishment for each base or wing, fleet size may not be limited to the minimum needed to provide essential vehicle services under normal conditions.[23] As well, without an updated life-cycle standard to assess the vehicle utilization, it remains uncertain whether vehicles are being used to their full potential to optimize the size of the CPV fleet.

Recommendations

3. Validate the size and mix of base/wing CPV fleet establishments and ensure vehicles are effectively utilized.
OPI: VCDS, Comd RCN, Comd CA, Comd RCAF, and CMP

4. Reassess the ELE guidelines with input from L1s to ensure they reflect current usage, maintenance costs, and market factors.
OPI: ADM(Mat)

[21] Analysis limited to certain vehicle types—station wagon, carry-all (up to nine passengers), crew cab (one ton or less), panel van, and auto sedan.
[22] Analysis based on average annual usage (FMS data) and average disposal age (RPM data).
[23] Transportation Manual, TD 141, 30 June 2010.

Fleet Aging

With an annual turnover rate of eight percent, it would take DND on average 12 years to recapitalize the CPV fleet.

Low Fleet Turnover

The low rate of fleet turnover increases the age of each vehicle and the associated maintenance costs. The average ELE life for the SCL and SCH fleets combined is 7.2 years, which means that vehicles are being retained five years longer than expected. At the time of the audit, 41 percent of the CPV fleet was being held beyond its expected due-out year with an average age of 11 years. As Tables 3 and 4 portray, vehicle utilization rates decrease as the CPV fleet ages. A similar conclusion was reached in the 1997 DSVPM study. For vehicles scheduled for disposal that were compared to the DND average utilization, the audit found that the SCL fleet usage declined from 94 percent to 70 percent as the vehicle age climbed from seven years to over 10 years, and the SCH fleet usage declined from 106 percent to 86 percent as the vehicle age increased from 21 years to over 25 years.

Number of Vehicles Due Out	Average ELE	Average Age	Percentage Usage	Vehicles with Age 8 – 10	Percentage Usage	Vehicles with Age > 10	Percentage Usage
3,387	4	7	94%	733	80%	173	70%

Table 3. Utilization of Due-out SCL Vehicles Based on Age. At the end of January 2011, 46 percent of the SCL fleet (7,355) was being held three years above the average ELE. Percentage usage is based on DND average.

Number of Vehicles Due Out	Average ELE	Average Age	Percentage Usage	Vehicles with Age 21 – 25	Percentage Usage	Vehicles with Age > 25	Percentage Usage
1,171	14	21	106%	301	102%	202	86%

Table 4. Utilization of Due-out SCH Vehicles Based on Age. At the end of January 2011, 31 percent of the SCH fleet (3,816) was being held seven years above the average ELE. Percentage usage is based on DND average.

Maintenance and Resale Impact

Repair Cost. As vehicles age, more frequent and critical breakdowns result in higher maintenance costs and lower availability. The optimal disposal point prescribed in the Transportation Manual is when the maintenance costs start to exceed the annual amortization. The audit found that 31 percent of the CPV fleet met this criterion for disposal with maintenance costs that exceeded the amortization by $11 million[24] per year. If the annual amortization was based on the actual retention period of a vehicle rather than the ELE guideline, more vehicles would likely meet the criterion for disposal.

[24] Based on the Cost Factors Manual FY 2010/11.

Resale Value. Older vehicles also reduce the potential revenue from remarketing. For example, the resale value decreases 33 percent[25] if disposal of an auto sedan is postponed for two years beyond its scheduled disposal date. On average, the SCL fleet vehicles are sold for 25 percent of their purchase price but are retained at least two years longer than the recommended ELE due-out year.

SCH Procurement Lead Time

Unlike the SCL fleet, a primary cause for longer retention of SCH vehicles is the extended acquisition period from the time of order to the time of delivery. It is not unusual to take 16 months or longer to acquire specialized vehicles. In FY 2011/12, 86 percent of the Department's annual SCH vehicle acquisition was not delivered within the fiscal year and had been delayed more than one fiscal year. This procurement delay contributed to the establishment shortfall of 540 SCH vehicles for a potential replacement cost of $90 million. In one instance of a delayed SCH vehicle procurement, a replacement forklift had to be rented for 20 months with an average annual cost of $18,600, whereas the expected annual amortization of such a vehicle is $9,333 based on a useful life of 12 years.

Most SCH vehicles are not off-the-shelf commodities and take up to a year for the original equipment manufacturer to build to order. Unless an SOA is in place to simply execute the purchase through a call-up, the lengthy contracting process from request for proposal to bid evaluation must be followed every time a requirement for these vehicles is raised. Currently, the Department has one SOA in place that covers only 4.6 percent of the vehicles in the SCH fleet. Other SOAs are being established to enable call-ups for 32 percent[26] of the SCH fleet. This will relieve some of the challenges of completing SCH acquisitions within the fiscal year allocation of MR funds. For the SCH vehicle procurements that have long lead times, L1 managers need to make early commitments of the MR resources available in the annual business plan three-year forecast.

Recurring MR Expenditure Approval Limit

The administrative procedures for the MR[27] acquisitions are very restrictive. Currently, the L1s can approve MR CPV purchases up to $1 million in value. However, to recapitalize the CPV fleet in accordance with the ELE guidelines, the Department would have to spend up to $92 million[28] per year. Many MR CPV projects would have to be raised by L1s every year to prevent CPV fleet rust-out.

[25] Analysis of RPM data from FY 2008/09 up to the end of December 2011.
[26] SOAs in progress for certain forklifts and other construction vehicles; information provided by DLP 10.
[27] Previously known as "MR" in the PAG, which was superseded by the PAD in September 2011. The approval limit remains the same in the PAD, Chapter 6, B 6.1.13—$5 million for MRs and $1 million for recurring MRs.
[28] Annual amortization of the CPV fleet is derived from the original acquisition cost ($665 million) divided by the average ELE of 7.2 years.

For CPV MR projects that exceed $1 million but are less than $5 million, ADM(Mat) may approve. However, in the case of an RCAF replacement of five fire trucks, each one costing | | | | | | | | | | | | a major | | | | | | | | | | [29] project was raised for approval by the Minister of National Defence and requires the same rigorous approval process as do new equipment capabilities. A more efficient means of recurring MR project approvals is needed to address the aging CPV fleet. Although the PAD is under review to streamline the capital project approval process, an interim measure should be considered to increase the L1 MR threshold to $1.5 million. This expenditure approval limit has not been updated since 1998 and should be increased in accordance with the escalation rate[30] in the DND Historical Economic Model.

Slippage in the CPV fleet recapitalization, as a key contributor to fleet aging, is due to long procurement lead times and a lengthy approval process, and creates a need for longer-term financial commitments. Efforts are needed to streamline the process, otherwise the CPV fleet will continue to age. Given the lead times necessary for the SCH fleet, it is not possible to execute an annual allocation of MR funds within the same year. Therefore, longer-term financial planning is needed until the approval and procurement can be streamlined.

Recommendations

5. Commit funding for long-lead-time SCH vehicle acquisitions from the three-year forecast in annual business plans.
OPI: Comd RCN, Comd CA, Comd RCAF, and CMP

6. In order to reduce procurement lead times, develop a prioritized strategy with PWGSC to put in place more SOAs where appropriate for the SCH fleet.
OPI: ADM(Mat)

7. As an interim measure to streamline the project approval process for the CPV fleet recapitalization, revise the PAD to increase the Minor Projects ceiling from $1 million to $1.5 million for L1s.
OPI: VCDS

[29] The project estimate of | | | | | | | | | | | was comprised of equipment cost of | | | | | | | | | | | | taxes, contingency and associated Project Management Office costs.
[30] Escalation rate based on 2010 Historical Standard Object report of the DND Economic Model.

Information for Decision Making

The data contained in the information systems used to manage the CPV fleet lacked sufficient integrity to support life-cycle management decisions.

Information systems are integral to the operation of any fleet so that the total cost of ownership from acquisition to disposal can be minimized. Accordingly, data must be complete and accurate so that fleet managers can assess performance and make informed decisions. For example, it is the role of the L1 CPV fleet managers to monitor the quality of information in FMS. It is necessary to improve the quality of the information entered in the four information systems that are used for the management of the CPV fleet.

FMS. This is an online system used to assist fleet managers in tracking vehicles and collecting utilization data. It is the key component used to comply with TB's fleet reporting policy. FMS is intended to capture the following information:

- **Number of Trips.** Only MSE pools, which represent 15 percent of the CPV fleet, recorded the number of trips taken by vehicles in the FMS. This information is key to substantiating requirements for vehicles with low Km usage that are used frequently for short trips.
- **Rental Data.** Accurate rental information is required to enable proper cost benefit analysis for acquisition decisions. Some information regarding vehicle rentals was determined to be either incorrect or incomplete. For example:
  - the rental data of 59 percent of a sample of 4,274 transactions was found to be either inconsistent or incomplete; 80 percent of the sampled vehicle rentals had no rental costs recorded in FMS at one of the sites visited; and
  - the rental reason code for "Establishment Deficiency" was incorrectly used for "MSE Downtime" rentals. This error could lead to the unnecessary procurement of new vehicles, even though the cause could be a temporary maintenance backlog.
- **Fuel Consumption.** In a directed sample of 46 vehicles, 63 percent of the fuel records were questionable. The audit found inaccurate fuel consumption occurred in most cases when a user of a vehicle failed to capture monthly fuel costs. This leads to inaccurate reports to the Treasury Board Secretariat regarding the Department's vehicle greenhouse gas emissions. For example, one vehicle was recorded to have travelled over 16,000 Km while only consuming 556 litres of gasoline, a rate of 3.4 litres per 100 Km.
- **Replacement Data.** Information for disposal decisions was not accurate for some vehicles since over 500 vehicles had due-out years that were more than three years longer or shorter than the ELE due-out year. Out of 266 resale transactions during the first quarter of 2011, at least 20 vehicles had disposal data (i.e., resale dates and values) that were inconsistent with the RPM records.

PE. This maintenance workshop management system is used to manage production and collect maintenance-related data for each CPV. Directed audit samples of the source document for records in PE—1,100 work orders in total—resulted in the following observations:

- **Work Orders and Service Times.** Eight percent of the work order sample could not be located in PE. Half of the service times in the maintenance work orders sample did not agree to the corresponding PE entry. This prevents maintenance shop managers from accurately assessing productivity or capturing all of the maintenance costs per vehicle.
- **VOR.** One quarter of the work order sample did not match the VOR information in PE. In these instances, PE records portrayed the vehicle maintenance time to be longer than on the sampled work orders 70 percent of the time. One cause of the prolonged VOR time was that work orders were being left open while awaiting available labour, parts, or repair decisions, although in some instances the vehicle was still operable. Inaccurate PE records prevent fleet managers from determining the major causes of the VOR rates.
- **Types of Service.** PE records did not always distinguish preventative maintenance from corrective maintenance, with 27 percent of the audit sample found to be inaccurate in that regard. As well, maintenance performed under warranty was seldom identified—for the bases visited, only 0.2 percent of all the work orders recorded in PE was warranty work. Without accurate maintenance work information, it is difficult for fleet managers to optimize resource allocation.
- **System Reporting Error.** The audit found a few instances where repair costs were randomly doubled in a system-generated report. Although the frequency of this system reporting error could not be determined by the audit, fleet managers seldom use the Work Order Cost Detail report due to the lack of confidence in repair costs.

Other Systems

- **DRMIS.** A workshop maintenance module in DRMIS is in the process of being rolled out to replace PE as the maintenance information system. The audit of an existing DRMIS module that records all DND vehicle holdings found 207 SMP vehicles[31] had been categorized as CPVs when compared to FMS records. The inconsistent classification of vehicle types may result in decisions based on an erroneous fleet mix of SMP and CPV.
- **RPM.** This fleet management tool helps monitor and compare vehicle resale performance. A few errors were found in the RPM data that could impact resale trend analysis results for certain vehicle types.

The causes of data integrity issues vary. In most cases information system users have input incorrect information, and in some instances instructions were unclear as to what data should be entered or how. System limitations also play a role in the quality of information. In the short term, there are no plans to integrate these information systems due to higher-priority applications in the Department. Information entered in one system often requires a duplicate entry in a second system. Therefore, there is a higher probability of data entry error and inconsistent data between systems.

In light of these multiple data integrity issues, decisions based on such information may not be the most cost effective.

[31] Minimal analysis of DRMIS was performed as it was being phased in during the conduct of the audit.

Recommendation

8. Fleet owners and managers should develop and implement an approach to improve the integrity of information used to support CPV fleet life-cycle decisions.
OPI: VCDS, Comd RCN, Comd CA, Comd RCAF, and CMP

Conclusion

The CPV fleet is a capital resource that enables DND to fulfill its role and honour its commitments.[32] The associated management procedures must minimize life-cycle cost while meeting operational requirements.[33] The optimal life-cycle management relies on the following:

- a clear policy with routine oversight and performance measures;
- legitimate fleet size and mix requirements;
- timely replacement acquisition to minimize O&M costs; and
- reliable and timely information to facilitate decision making.

The current Transportation Manual has not kept pace with the devolved function of fleet management. Compliance to Transportation Manual policy could not be fully assessed due to staffing issues, the lack of a common checking tool, and few performance measures. Moreover, establishment of an optimal fleet size and mix could not be readily validated as such information was not kept up-to-date in the FMS and the existing life-cycle guidelines do not adequately support the utilization pattern of the Department. Furthermore, the administrative burden and the long lead time to recapitalize the CPV fleet have the potential to increase O&M costs as the fleet ages. Finally, information system limitations and data integrity issues from user inputs have limited the accurate determination of the total cost of ownership.

[32] Transportation Manual, Chapter 3, Section 1, paragraph 1, 30 June 2010.
[33] Transportation Manual, Chapter 1, Section 2, paragraph 29, 30 June 2010.

Annex A—Management Action Plan

Fleet Management Policy

CRS Recommendation (High Significance)

1. With inputs from the L1s, management roles, policies and performance standards should be clarified within the Transportation Manual in order to avoid duplication of effort. Additionally, other fleet management frameworks should be considered to ensure the devolved transportation functions are performed effectively at the most appropriate level of command.

Management Action

With DSVPM's assistance and input from associated L1s, D Tn is conducting a review of fleet management policies and practices within the Department. This review will indicate, among other things, whether the Department could benefit from the application of other fleet management frameworks or models. The intent is to provide ADM(Mat) with final recommendations by 15 March 2013. The implementation of approved recommendations will commence and, if possible, be completed during FY 2013/14. Clarification of management roles, policies, and performance standards will be incorporated into the July 2013 release of the Transportation Manual, as appropriate. This review will consider the integration of transportation industry best practices, when permissible under applicable governmental policies, regulations, and procedures.

OPI: ADM(Mat)/DCOS(Mat)/D Tn
Target Date: 31 July 2013

Annex A

Oversight of Fleet Management

CRS Recommendation (High Significance)

2. With input from the L1s, establish a standard SIV/SAV for the CPV fleet to be used and submitted by the L1s as information to revise the policy.

Management Action

D Tn will develop a standard SIV/SAV matrix in order to ensure a common and correct approach to fleet management and constitute a solid baseline from which to gauge performance in this domain. Further, D Tn will pursue the establishment of a stronger corporate monitoring capability at the strategic level in order to have a better overview of all fleet management activities.

A well-designed SIV/SAV matrix will assist, amongst other things, in determining whether the following procedures/processes are being adhered to/performed correctly: fleet establishment/validation, vehicle procurement, vehicle usage, and vehicle disposition.

OPI: ADM(Mat)/DCOS(Mat)/D Tn
Target Date: 30 June 2013

Fleet Requirements

CRS Recommendation (Moderate Significance)

3. Validate the size and mix of base/wing CPV fleet establishment and ensure vehicles are effectively utilized.

Management Action

Each year, CFSU(O) will use DSVPM life-cycle recommendations for light vehicles and more accurate FMS data to perform a formal validation of its vehicle fleet. Results will be presented to VCDS for approval annually.

OPI: VCDS
Target Date: 31 March 2013

Entire fleet validations are to be conducted every five years. Fleet Management Cells will continue with mini-validations for every vehicle slated for replacement, movement to a different organization, or new acquisition. The entire fleet validation will be staged over a number of years due to the size of the vehicle fleets in Maritime Forces Atlantic and Maritime Forces Pacific.

OPI: Comd RCN
Target Date: Ongoing over a five-year period for full validation

The CA headquarters is examining the resources required to initiate and administer the validation process across the Army. Concurrently, the CA G4 Transportation is working with Director Land Requirements (DLR) 6 and the subordinate formations to optimize the CA CPV fleet.

OPI: Comd CA
Target Date: 31 December 2014

The RCAF is in the process of validating its CPV fleet's establishment. The vehicle fleet validation will confirm that RCAF fleet holdings are optimized and that the Department's FMS accurately reflects the RCAF fleet establishment. Further, the RCAF vehicle fleet management, governance and control processes will be enhanced by requiring annual wing-level vehicle establishment reviews and implementing bi-annual command-level inspection visits.

OPI: Comd RCAF
Target Date: 31 March 2013

Canadian Defence Academy (CDA) through Canadian Forces Support Training Group has initiated a fleet validation to ensure the commercial pattern fleet consists of the best vehicle(s) in the right quantity to meet mandated training. This validation commenced on 29 October 2012 with a completion date of 31 March 2013.

OPI: CMP/Comd CDA
Target Date: 31 March 2013

CRS Recommendation (High Significance)

4. Reassess the ELE guidelines with input from L1s to ensure they reflect current usage, maintenance costs and market factors.

Management Action

Director General Land Equipment Program Management (DGLEPM)—supported by D Tn—will gather information on operating costs (primarily fuel and maintenance) and remarketing revenues. This information—in conjunction with procurement costs—will be used to determine the optimum service life of the vehicles, using either National Association of Fleet Administration life-cycle analysis or a software program such as AGE/CON. A new ELE will be published by December 2013. Success will be measured by a reduction in the percentage of underutilized equipment and a reduction in the proportion of equipment exceeding ELE guidelines (corollary—higher proportion of equipment reaching ELE).

OPI: ADM(Mat)/DGLEPM/DSVPM
Target Date: 31 December 2013

Annex A

Fleet Aging

CRS Recommendation (High Significance)

5. Commit funding for long-lead-time SCH vehicles acquisitions from the three-year forecast in annual business plans.

Management Action

Vehicle capital acquisition and funding plans currently look out for five years and continue to be identified as part of the annual business plan. These acquisition plans are reviewed/adjusted annually due to both slippage and budgetary constraints.

OPI: Comd RCN
Target Date: Within two months of annual business plan approval

The CA/DLR has been including the recapitalization of the CPV fleet, both SCL and SCH, in its business plan for some time and will continue to do so, revising its estimates as new circumstances arise.

OPI: Comd CA
Target Date: Complete/Continue with current practice

The CRS recommendation to commit three-year funding for long-lead-time SCH vehicles acquisitions has been in place within the RCAF for several years. This continues to enable a portion of our three-year forecasted budget to be committed to specific SCH acquisitions in the future.

OPI: Comd RCAF
Target Date: Completed

At this time no business planning for the FY 14/15 has taken place as the fleet validation is ongoing. Upon receipt of the validation a three-year life cycle program will be forecasted and implemented in the business plan accordingly.

OPI: CMP/Comd CDA
Target Date: 30 June 2013

CRS Recommendation (High Significance)

6. In order to reduce procurement lead times, develop a prioritized strategy with PWGSC to put in place more SOAs where appropriate for the SCH fleet.

Management Action

DGLEPM will work with supported L1s to develop requirements that are consolidated, in priority, and synchronized. DGLEPM will work with PWGSC (the contracting authority) to develop procurement strategies suited to recurring commercial pattern equipment requirements. Success will be measured by simpler and faster procurement with less DSVPM/DLP staff effort.

OPI: ADM(Mat)/DGLEPM/DSVPM
Target Date: 31 March 2013

CRS Recommendation (Moderate Significance)

7. As an interim measure to streamline the project approval process for the CPV fleet recapitalization, revise the PAD to increase the Minor Projects ceiling from $1 million to $1.5 million for L1s.

Management Action

Until recently, the Vote 5 Minor Capital Project expenditure authorities were listed in the PAD and used as a reference point for capital expenditures under $5 million. DND's Delegations of Authorities for Financial Administration Matrix provides the instrument whereby the Deputy Minister and the Minister annually provide this delegation. An interim change to the matrix (and therefore the PAD) will be considered once the results of the Business Process Renewal exercise are known, as it has a recommendation for streamlining low-risk projects as one of its deliverables.

OPI: VCDS
Target Date: 30 June 2013

Annex A

Information for Decision Making

CRS Recommendation (Moderate Significance)

8. Fleet owners and managers should develop and implement an approach to improve the integrity of information used to support CPV fleet life-cycle decisions.

Management Action

The CFSU(O) Transportation Officer will review and amend the Standard Operating Procedures to ensure that FMS data is entered in a timely manner. The improvement in data collection will of course positively impact optimization of our vehicle fleet.

OPI: VCDS
Target Date: 31 December 2012

The implementation of DRMIS for transportation and electrical and mechanical engineering is expected to be complete by 31 December 2012. With the implementation of DRMIS, coupled with the proposed enhancement to the FMS program, more accurate data for maintenance will be available to fleet managers. Fleet managers require user units to provide full data on vehicle usage, including number of details performed and fuel consumption. Fleet managers will use the information to provide better supporting data for fleet retention and life-cycle decisions.

OPI: Comd RCN
Target Date: 31 December 2012

VCDS/ADM(Mat)/D Tn are responsible for the policies and tools to gather and validate the information used to support CPV fleet life-cycle decisions. Once the tools in either FMS or a DRMIS module have been modified and direction for use promulgated, the CA will adapt those policies in its own fleet management policy. In the interim, DLR 6 will continue to engage with D Tn, DSVPM and other fleet owners to improve best practices and aid in the effective management of the CA commercial fleet.

OPI: Comd CA
Target Date: CA policies will be amended and brought in line with higher directives, once those have been updated and promulgated. Anticipated completion date is 31 December 2015.

The RCAF will conduct a review of its FMS database holdings and this should correct many of the identified deficiencies. Furthermore, procedures and oversight mechanisms will be put in place to strengthen data integrity and enhance our ability to support vehicle life-cycle decisions. Lastly, the RCAF will strengthen its fleet management best practices through enhanced inspection visits and internal communication.

OPI: Comd RCAF
Target Date: 31 March 2013

As a part of fleet validation, process meetings will be held with fleet users to ensure that any decisions on the composition of the fleet take into account user requirements. This is a continual and evolving process that ensures the integrity of the fleet life-cycle program and allows any decisions that may affect the fleet to be open for user input.

OPI: CMP/Comd CDA
Target Date: 31 March 2013

Annex B—Audit Criteria

Objective

To assess the governance, risk management and control processes relating to the life-cycle management of the CPV fleet, including procurement, in-service management and disposal.

Criteria

- A governance framework is in place to effectively implement the life-cycle management policies of the CPV fleet.
- The management control framework for the CPV fleet supports all stages of life-cycle management—requirements definition, procurement, sustainment, and disposal.
- Fleet management information is available on a timely basis for decision-making and monitoring purposes.

Sources

- TB Policy Framework for the Management of Assets and Acquired Services, November 2006.
- TB Directive on Fleet Management: Light Duty Vehicles, November 2006.
- TB Guide to Fleet Management, July 2007.
- DND Transportation Manual.