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RESEARCH NOTE 9607

SOME INSIGHTS INTO PRIORITIES AND COSTS
IN CHIEF OF MILITARY PERSONNEL BRANCH

BY

Dr. D. J. Chiasson
and
A. G. Boothroyd

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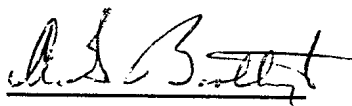
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ABSTRACT

The Canadian forces are going through difficult and complex tasks of downsizing. This note describes how the operational research team in ADM(Per) provided information relating costs and priorities to Chief Military Personnel (CMP) to assist in setting priorities during the restructuring of the branch.

RÉSUMÉ

La réduction du personnel au sein des Forces Canadiennes a engendré des tâches complexes et difficiles à faire. Ce document a pour but de décrire comment l'équipe de recherche en matière du personnel dans SMA(Per) a assisté le Chef-Personnel militaire durant la reconstruction de la branche en lui fournissant de l'information relative sur les coûts et priorités à suivre.

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ANNEX A A1

"The purpose of computing is insight, not numbers."¹

Introduction

1 In the summer of 1995, the Chief of Military Personnel (CMP) approached the Operational Research Team within ADM(Per) to examine tasks being done within the branch, the priorities of these tasks, and the level of personnel resources assigned to them. Because of meeting deadlines, there was time for only a quick study.

Problem

2 It is possible to examine the usage of personnel resources in several ways. The SWE (salary wage envelope²) is a simple, easily understood and yet robust measure based on salary. It was agreed by CMP that our analysis should use this as a measure of where resources are being used, i.e. as a measure of "Bang for the Buck." To consider the priorities aspect we were instructed to use the hierarchical priorities of the varying levels in ADM Per and to focus these on the overarching set of ten ADM (Per) priorities. (See Table I). Our instructions explicitly required us not to attempt to simply provide a consensus amongst the staff.

3 We took information from CMP's organization charts and establishment manning printouts and added basic salary costs from the Cost Factors Manual published by D Cost S. The intent was to take readily available data and provide insight by sorting, filtering and displaying it in different ways.

4 The simplest way to categorize tasks and assign priorities was to use the priorities as stated by ADM(Per) a few months earlier. His list was in accord with those of the department, placing greatest emphasis on operations, obeying the law and then elements that offer direct support to operations. Specifically, the ADM (Per) priorities were as follows (1 is highest priority):

¹ This insight is taken from an early book on numerical analysis by Hamming, reference 1.

² The FTE (Full Time Equivalent) may be a more general term as it allows part time and contract staff.

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TABLE I
ADM (PER) PRIORITIES

Priority	PER Group Capability
1	J1 Ops Support
2	Implementation of Legislation or imposed political direction
3	Management of government policy objectives and support / advice to senior CF/DND management on human resource issues.
4	Career management
5	Training
6	Education
7	Medical / Dental
8	Recruiting & selection
9	Physical fitness standards
10	Non-Operational support

5 This list is non controversial, but there can be ambiguities such as: defining the difference between education and training; deciding whether keeping records is support or implementing legislation or managing government policy objectives; deciding if support for a high priority task takes on the priority of the task itself or is just support. Examination of results indicated that the process described here was robust, that is insensitive to small changes in priorities.

Data Gathering

6 The examination of costs and priorities required estimates of tasks and personnel involved. Because of the ongoing state of flux within headquarters, the entire exercise was

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done twice in a short period (about two months). For the sake of brevity, this note is written as if only one general analysis was conducted.

7 To scope the problem we conducted an initial back of the envelope approach. In so doing we looked simply at the title of each section in each directorate and used that as an indicator of each section's job. Each directorate / group was asked to assign its own priorities based on Table I. To ensure inclusion and costs of senior managers, a priority of zero was assigned to DGs and Directors, It was also assumed that they split their time among all the tasks under their control. Initially the NDHQ telephone book provided data on staff levels and ranks within the directorates and sections. These were then confirmed by using establishment and personnel print-outs from DEPR, and followed by brief confirmatory discussions with directors. The authors then assigned a single overall priority to each section. While this approach was quick, there were problems.

8 To begin, the first pass at the information simply looked at the tasks of sections. While this was quick, we felt that the directors and section heads might not yet have a grasp on how time should be allocated. While seemingly simple, this approach could not work because each directorate continually does a variety of tasks. As well, this approach upset some directors at some choices because the tasks were felt to be overlapping and vague. Nonetheless, CMP was briefed, at his request, at less than one week into the study. Already, some indications of results were beginning to form. Appropriate caveats were of course strongly emphasized.

9 The second pass happened after one of the reorganizations. This time, information sheets were circulated to each section head, director and DG, showing the ADM priorities and the number of staff we had determined to now work in each directorate. We simply asked each manager to show, very roughly, how much time was being spent by the staffs doing each task. We allowed about a week for replies and three days for ourselves to enter and analyze the results.

10 The data gathering caused some consternation, mainly because, for this second pass, info sheets and survey forms went directly to section heads. This upset some directors who felt that such information should go through channels. Our position was that

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the section heads knew what their jobs were and could be relied upon to give the best estimates of how much time was spent on each of their tasks.

11 Our aim was a broad brush picture of costs for each task area, but some staff agonized over their replies. Some sections felt their people were working very hard, which they showed by recording that member of their staff put in a total of 1.1 PYs per year. Others were liberal in their interpretation of priority and assumed that any task indirectly supporting a priority one task was then also priority one. Because of the time pressures, we did not dispute these interpretations. We were more interested in prompt rather than exact answers. Thus, for example, we essentially ignored items that took less than 0.1 PY³. In only a very few cases - high priority tasks that occupy small amounts of time - would such omissions perhaps be misleading.

12 The process of gathering information required care because CMP was in a state of flux due to reorganizations. This meant some personnel were uncertain of how much time would be used on the various tasks following the reorganization. We used organization charts, the phone book, and establishment staffing lists to accumulate information on personnel, job classifications and ranks. This preliminary information in the data base was used to generate forms with estimated numbers of personnel for the survey.

13 We did not consider DMPS or DSA because it was already known that they were moving out from CMP.

14 Finally, we looked at the costs of the tasks. The costs were based on salaries of personnel from Cost Factors Manual as published by D Cost S, see reference 2. The figures taken were average salaries for the level of the incumbent rather than the salary of the person. This approach ignores some overhead requirements such as office space. There may be a case to use the full cost rather than just voted salary.

Tools

³We assume a person year is one working year, independent of vacation leave, sick leave, or holidays. As an *approximation*, 0.1 PY is a month and 0.01 PY is two working days.

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15 After the replies were collected, the information was entered into a data base using Microsoft Access. This resulted in a table consisting of 500+ rows and 40 columns for ranks and job classifications. The data base provided an analytical engine for sorting, filtering, and calculating costs. The basic data base was a "flat file," much like a spreadsheet. The addition of linked tables allowed easy relation between personnel costs and ranks.

16 A spread sheet program could do most of the operations discussed in the note, but data base programs offer more options and robustness in terms of designing forms for data input and output as well as sorting and selection of sub sets of data⁴. The spreadsheet was more convenient for finding certain totals and generating graphs. The techniques and programs we used were done as one-off efforts and would not be appropriate for a production system without considerable thought to the user interface.

17 Thus, given the data and the tools we then went on to generate tables and graphs of what CMP's people were doing, the priorities of their work and the costs of doing it.

Results

18 Our first task with the data was, essentially, to do a set of sanity checks. Specifically we totalled the number of people in CMP along with their rank and classification information. Table II shows PYs for CMP military personnel, rank vs directorate. Table III shows what priorities occupy the time of the various ranks. The tables speak for themselves.

⁴ The author knows of one case where a university lecturer kept student grades on a spreadsheet. After the final exam, he intended to post the final grades, sorted on student number but without names. Unfortunately, when he sorted the data he sorted only the student numbers but did not sort the grades. Thus grade and student numbers did not match. The students were disconcerted, to say the least. This type of error is easy to make on a spreadsheet, and we wished to minimize the chance of such a slip.

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TABLE II
MILITARY PYs TO DIRECTORATES

Owner	BGen	Col	LCol	Maj	Capt	CWO	MWO	WO	Sgt	MCpl	Cpl	Total
-DGMC	0.9	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.9
-DGMP	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
DPersPlan	0.0	1.0	5.0	13.0	18.0	0.0	8.0	1.0	1.0	0.0	1.0	48.0
D Pers Pol	0.0	1.0	4.2	4.6	2.0	0.0	0.0	0.0	0.0	0.0	0.0	11.8
DEPR	0.0	1.0	1.0	8.0	5.0	0.0	0.0	1.0	0.0	0.0	3.0	19.0
DPCA	0.0	1.0	2.0	3.2	16.5	2.0	0.0	2.3	12.2	4.3	8.8	52.3
DPCO	0.0	1.0	5.0	28.0	8.0	0.0	0.0	0.0	2.0	4.0	5.0	53.0
DPCOR	0.0	1.1	1.1	5.4	12.1	43.1	18.5	17.2	1.1	5.5	4.4	109.5
DRET	0.0	1.0	6.0	16.5	3.6	1.0	0.0	0.0	0.0	1.0	0.0	29.0
J1	0.0	0.0	0.0	2.0	3.0	0.0	0.0	0.0	1.0	1.0	0.0	7.0
PRT	0.0	0.0	1.0	4.0	8.0	0.0	0.0	0.0	1.0	0.0	1.0	15.0
Total	2.0	7.1	25.2	84.6	77.1	46.1	26.5	21.5	19.3	15.8	23.2	348.5

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TABLE III
MILITARY PYs VS PRIORITIES

ADM Per Pri	BGen	Col Time	LCol	Maj	Capt	CWO	MWO	WO	Sgt	MCpl	Cpl	Total
1.0	0.1	0.4	0.4	4.9	3.2	0.0	0.0	0.0	1.0	1.0	0.0	11.0
2.0	0.4	2.0	3.4	5.7	2.5	3.0	1.4	1.2	0.3	0.0	0.1	19.9
3.0	0.8	1.4	10.0	31.2	36.9	0.0	7.1	1.7	2.7	0.0	4.9	96.6
4.0	0.3	2.3	4.7	15.6	25.5	42.1	17.1	15.9	8.7	11.3	16.2	159.6
5.0	0.1	0.6	3.7	13.3	2.1	1.0	0.0	0.0	0.5	0.0	0.0	21.2
6.0	0.1	0.2	1.0	4.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	6.2
7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.0	0.1	0.1	0.6	1.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0	3.6
9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.0	0.4	0.3	1.5	8.0	5.3	0.0	0.9	2.7	6.1	3.5	2.1	30.7
Total	2.0	7.1	25.3	84.6	77.1	46.1	26.5	21.5	19.3	15.8	23.2	348.5

19 Figure 1 shows the cost of running each directorate. Both this and the following graph really should be looked at in terms of customers served and complexity of tasks as well, obviously, as the cost element. High costs do not necessarily suggest a profligate directorate.

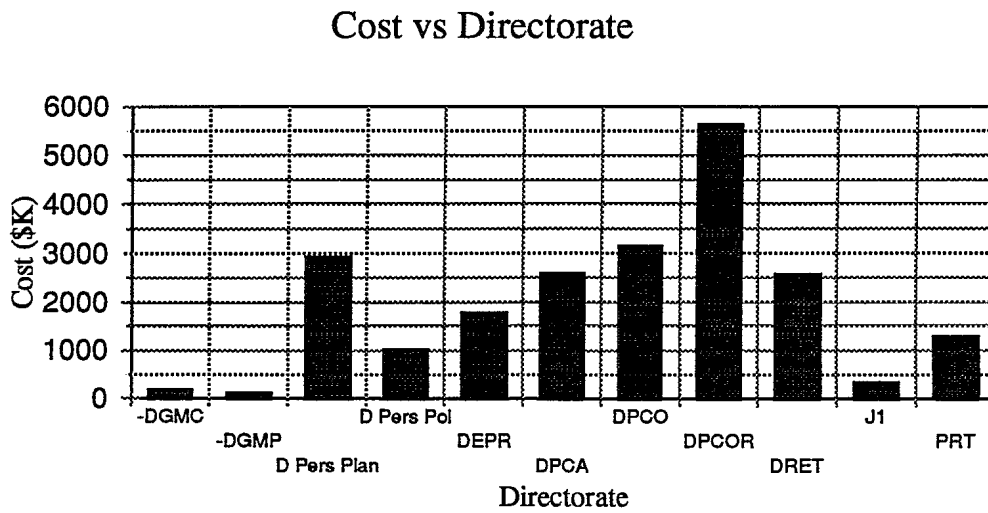


Figure 1: Salary Cost of CMP Directorates

20 Figure 2 shows the costs associated with each ADM(Per) priority. Again the highest costs are those of managing personnel and are associated with priorities 3 and 4.

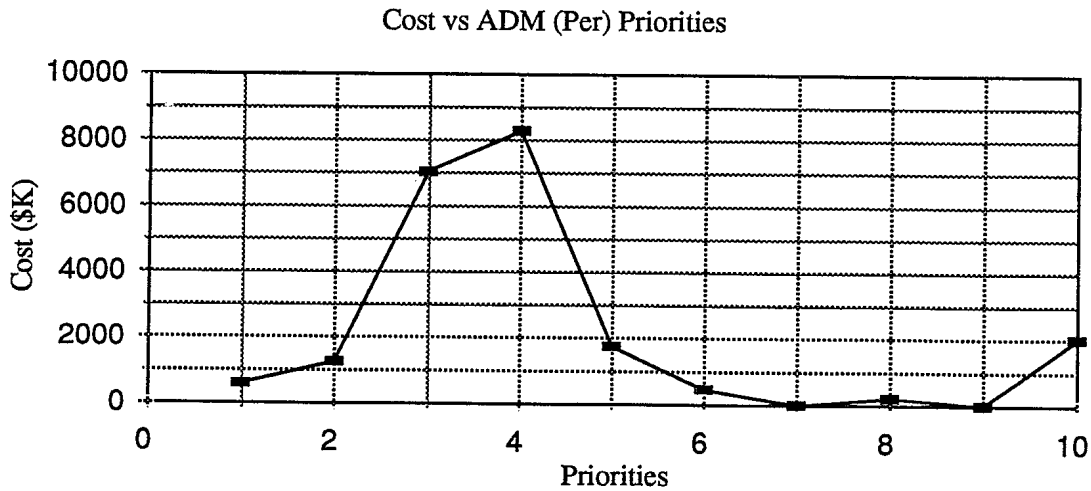


Figure 2: Salary Cost of ADM(Per) Priorities

21 Graphs and tables such as these are simple to generate. The data base provided the ability to do counts and cross tabs and weighted sums of the various data fields. Most could be done by simple visual queries or automated report generating procedures, although calculations of total cost required simple SQL (structured query language) programming.

Comments

22 To repeat the motto that began this report, "The purpose of computing is insight, not numbers." While precise numbers have a value in balancing a cheque book, the use of a single numeric metric that is (as here) based on qualitative judgements, is suspect. Therefore, we feel it necessary to make several comments on the study.

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23 The first is that we present no conclusions, nor any significant comments on the data. This is in keeping with the initial premise that the aim was insight and not answers. We emphasized to all concerned that the process was one of visualization, that is, attempting to find new ways to look at what happens in the branch. It was not possible to say, "Well, we simply won't do any priority ten items." Priority ten items must be done. The problem is allocating the correct balance of resources among the items.

24 A major risk is that users will believe that answers, rather than results, are produced by an analysis using quantitative methods, the "Garbage in, Gospel out" phenomenon. The intent of the authors was not to tell decision makers what to do, but to present information in a better format, and so to enhance available information and understandings of it. There are some perception problems. For example, a low priority does not mean simply eliminating a task. The balancing act is to set priorities such that low priority items do not turn into crises. Deciding not to do something is another issue.

25 Calculations were based on salary alone because salary is the most obvious factor. The cost factors manual could have allowed us to go into more detail. The miscellaneous costs are significant, \$10,520 per military person compared to \$2,997 per civilian. Part of the difference, a significant \$3,535, is due to moving and posting allowance. The miscellaneous costs are averages and do not factor in the difference in office equipment and stationary between a general and a corporal. An item the authors found intriguing is that the annual cost for travel for military personnel is \$1,520 compared to \$593 for civilians. These factors could be important in deciding if a job should be done by civilian or military personnel.

26 The attached tables and graphs do not pretend to make any recommendations. There are programs that will provide answers, but they are either mechanisms for evaluating voting procedures (see next paragraph), or programs that require the user to set many parameters, like tuning a radio with many dials. Instead, we have taken a standard data base program and in the short time available before the sponsor needed our results, tried to put a perspective on those numbers.

27 There was a temptation to use one of the current decision making programs currently available. These programs take various approaches to decision and seem to provide answers, using more or less rigorous criteria. Typical of these is CDSP, the

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Consensus Decision Support Program, see references 3 and 4. It provides a statistical foundation to a search for an underlying consensus. Other methods often weight votes or eliminate outliers. In certain contexts - where questions are brought to a vote - this and similar approaches are valid, though the results may depend on the user of the program setting parameters in some seemingly arbitrary manner. The problem we faced was giving management with both information and insight, for them to reach a decision, not to arrive at a consensus. PORT (the operational research section of PRT, the Personnel Research Team) felt that at this preliminary stage, it was better to look at alternative methods of presenting data.

28 In conclusion, this methodology of presenting data based on costs vs senior management priorities seems useful. The advantage is in seeing the data in other lights and understanding use of resources. The tools are standard office automation programs and require few resources. Speed of producing an answer seems superior to more complex approaches because results are not dependent on complex mathematics.

29 This work was provided to CMP immediately on its completion, and then briefed to the Directors-General. It is interesting to reflect that the entire CMP branch was reorganized out of existence within a few weeks.

References:

- [1] Hamming, R. W., Numerical Methods for Scientists and Engineers, Mc Graw-Hill Book Company, 1962.
- [2] Cost Factors Manual 1995-1996, Directorate of Costing Services Publication, 23 March 1995.
- [3] Taylor, Ivan W. and Ormrod, Michael K., A Multi-Criteria Approach to Business Case Analysis; D Log A Research Note 9504; July 1995.
- [4] Taylor, I. W., A Spreadsheet Approach to Option Analysis for J3 Plans; D Log A Research Note RN-9506, December 1995. (Joint Staff Operational Research Cell - JSORC - note on the use of Multi Criteria Decision Making using an Excel spreadsheet; available from author.)

ANNEX A
EXAMINING PRIORITIES
NOVEMBER 1996

This annex consists of tables of data and background information related to discussions in the main text of the report.

The following table lists average salaries for selected civilian categories and military ranks.

TABLE A-I
AVERAGE SALARY COSTS

Rank	Salary	Category	Salary
General	\$118,618.00	AS1	\$35,780.00
LGen	\$118,618.00	AS3	\$41,950.00
MGen	\$98,489.00	AS4	\$45,154.00
BGen	\$84,910.00	AS5	\$52,346.00
Col	\$80,400.00	AS6	\$61,167.00
LCol	\$71,491.00	AS7	\$68,136.00
Maj	\$63,274.00	CR2	\$21,407.00
Capt	\$50,288.00	CR3	\$25,913.00
Lt	\$34,607.00	CR4	\$28,861.00
2Lt	\$29,395.00	CR5	\$32,597.00
Ocdt	\$10,602.00	CS2	\$46,209.00
CWO	\$52,717.00	CS3	\$55,595.00
MWO	\$47,570.00	CS4	\$64,165.00
WO	\$42,808.00	CS5	\$77,870.00
Sgt	\$38,660.00	DACon3	\$27,744.00
MCpl	\$35,797.00	DAPro4	\$34,650.00
Cpl	\$33,725.00	DS3	\$49,191.00
Pte(T)	\$25,714.00	DS4	\$62,770.00
Pte(B)	\$20,116.00	DS5	\$75,429.00
Pte(R)	\$10,768.00	OM4	\$55,142.00
		PE4	\$53,619.00
		SCY2	\$26,759.00
		SCY3	\$30,457.00

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The body of this note shows data in graphical form. Tables A-II and A-III give costs versus owner and directorate.

TABLE A-II
OWNER VS COSTS

Owner	Cost \$K
-DGMC	\$194
-DGMP	\$122
D Pers Plan	\$2,941
D Pers Pol	\$1,028
DEPR	\$1,773
DPCA	\$2,592
DPCO	\$3,149
DPCOR	\$5,638
DRET	\$2,575
J1	\$343
PRT	\$1,282
Total	\$21,637

TABLE A-III
PRIORITIES VS COSTS

User Pri	Cost \$K
1	\$599.00
2	\$1,268.00
3	\$7,037.00
4	\$8,279.00
5	\$1,750.00
6	\$474.00
7	\$0.00
8	\$211.00
9	\$0.00
10	\$2,019.00
Total	\$21,637

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The text noted that salary is only a part of full cost. Table A-IV shows salary to cost ratios for selected civilian categories, sorted by ratio. Table A-V show salary to cost ratios for military personnel, also sorted by ratio. Salaries of a Major and a DS-4 are similar, but full costs differ by over \$8,000. The average values included in tables A-IV and A-V must be read with care because they are not weighted to reflect the number of personnel at each level: there are more Privates than Generals.

TABLE A-IV
CIVILIAN COST-SALARY RATIOS

Rank	Salary	Full Cost	Ratio	Diff.
DS5	\$75,429	\$92,251	1.22	\$16,822
AS7	\$68,136	\$83,753	1.23	\$15,617
CS4	\$64,165	\$79,129	1.23	\$14,964
DS4	\$62,770	\$77,500	1.23	\$14,730
AS6	\$61,167	\$75,635	1.24	\$14,468
CS3	\$55,595	\$69,142	1.24	\$13,547
OM4	\$55,142	\$68,615	1.24	\$13,473
AS3	\$41,950	\$52,243	1.25	\$10,293
PE4	\$53,619	\$66,840	1.25	\$13,221
AS5	\$52,346	\$65,357	1.25	\$13,011
DS3	\$49,191	\$61,680	1.25	\$12,489
CS2	\$46,209	\$58,205	1.26	\$11,996
AS4	\$45,154	\$56,976	1.26	\$11,822
AS1	\$35,780	\$45,814	1.28	\$10,034
DAPro4	\$34,650	\$44,452	1.28	\$9,802
CR5	\$32,597	\$41,996	1.29	\$9,399
SCY3	\$30,457	\$39,440	1.29	\$8,983
CR4	\$28,861	\$37,531	1.30	\$8,670
DACon3	\$27,744	\$36,198	1.30	\$8,454
SCY2	\$26,759	\$35,021	1.31	\$8,262
CR3	\$25,913	\$34,009	1.31	\$8,096
CR2	\$21,407	\$28,627	1.34	\$7,220
Average	\$50,169	\$62,531	1.26	\$12,362

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TABLE A-V
MILITARY COST-SALARY RATIOS

Rank	Salary	Full Cost	Ratio	Diff.
LGen	\$118,618	\$156,129	1.32	\$37,511
General	\$118,618	\$156,129	1.32	\$37,511
MGen	\$98,489	\$130,988	1.33	\$32,499
Col	\$80,400	\$107,308	1.33	\$26,908
LCol	\$71,491	\$96,854	1.35	\$25,363
Maj	\$63,274	\$87,186	1.38	\$23,912
BGen	\$84,910	\$117,075	1.38	\$32,165
CWO	\$52,717	\$73,819	1.40	\$21,102
Capt	\$50,288	\$71,889	1.43	\$21,601
Lt	\$34,607	\$50,998	1.47	\$16,391
MWO	\$47,570	\$70,437	1.48	\$22,867
WO	\$42,808	\$64,490	1.51	\$21,682
2Lt	\$29,395	\$44,346	1.51	\$14,951
Sgt	\$38,660	\$59,242	1.53	\$20,582
MCpl	\$35,797	\$55,554	1.55	\$19,757
Pte(T)	\$25,714	\$39,981	1.55	\$14,267
Cpl	\$33,725	\$52,970	1.57	\$19,245
Pte(B)	\$20,116	\$33,024	1.64	\$12,908
Pte(R)	\$10,768	\$21,198	1.97	\$10,430
Ocdt	\$10,602	\$20,992	1.98	\$10,390
Average	\$53,428	\$75,530	1.50	\$22,102

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The Canadian forces are going through difficult and complex tasks of downsizing. This note describes how the operational research team in ADM(Per) provided information relating costs and priorities to Chief Military Personnel (CMP) to assist in setting priorities during the restructuring of the branch.

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