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Identification of Potential Risk Factors for Injury to Police Officers in Using New Technologies

December 31, 2009

Principal Investigator/Applicant
Axel Hovbrender

RS2008-IG15

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Research Secretariat
6951 Westminster Highway
Richmond, B.C. V7C 1C6
Phone (604) 244-6300 / Fax (604) 244-6299
Email: resquery@worksafebc.com

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Final Report:

Identification of Potential Risk Factors for Injury to Police Officers in Using New Technologies

(Project # RS2008-IG15)

Date: December 31, 2009

Principle Investigator: **Retired Supt Axel Hovbrender, M.O.M., BGS, MA**
Director, Police Academy
Justice Institute of BC
715 McBride Boulevard
New Westminster, BC

Co-Investigator: **Dr Silvia Ursula Raschke, PhD**
BCIT Technology Centre
Principle Investigator, CREATE
3700 Willingdon Avenue
Burnaby, B.C.

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Executive Summary

The overarching goal of this project was to identify ergonomic risk factors faced by police officers in their police vehicles and to develop strategies to address them. ***Approximately 50% of total Work Safe claims by BC police officers between 1997 and 2005 are either motor vehicle accident (MVA) or MSI injury (MSI) relate***.

Today's police officer works in a very different environment from a police officer's world twenty years ago. Advances in technology, changing demographics and emerging trends in policing combine to present a unique challenge to today's police departments when considering how to integrate these factors in a way that keeps police officers (and the community) safe, effective and up to date.

The project resulted in a wide range of issues being identified – some of which extended beyond the physical confines of the police vehicle interior. The recommendations are therefore organized in three categories: Vehicle Related, Equipment and Duty Belt and Outside Influences.

Vehicle Related

Most of the key issues identified during the course of the project, did in fact relate to factors within the police vehicle. Most importantly, the computer and computer mount, centre console (lights and siren control), light bars and arm rest are all installed in the vehicles with little consideration for how one impacts the use of the other or how they impact visibility or an officer's typical workflow**. Therefore it is recommended that municipal police departments work to develop a strategy to review equipment for both component effectiveness and how components work in combination with the other items as part of typical work flow and to implement a solution based on the findings.** This would need to be an ongoing process so that new technology can be reviewed and integrated seamlessly as it becomes available.

Other vehicle related factors identified as needing to be addressed were: external visibility of the police vehicle, seat issues. loose items in the car, education of police recruits on headrest and seatbelt height adjustments, electric adjustments of seat, mirror and door locks, organization of trunk in NCO Vehicles and the hooks in VPD wagons. Recommendations specific to each of these factors are made in the discussion of the results.

Equipment and Duty Belt

Discussion around an officer's duty belt and other equipment they carry with them – on their belt, as part of their uniform or in the car with them resulted in the identification that, while not part of the car itself, that these items need to be addressed as the impact how an officer sits, moves and works in the car. Two recommendations are made: First that officers are issued a nylon duty belt in place of a leather belt in jurisdictions in which this is not already being done. And second, that this issue be addressed in a separate project. The amount of equipment on the duty belt currently worn by an officer impacts an officer's lumbar spine when sitting or twisting to work on the computer. As well,

the number of things an officer has to access while working both in and out of the car could be a contributing factor to MSI. The current police BC uniform regulations were developed in the mid 1970's – a time at which ergonomics and functional design concepts did not exist. A recommendation is made that these be revisited and updated.

Outside Influences

Finally, two issues were identified that had nothing to do with the layout or equipment inside a police vehicle but had significance for both police service member safety as well as public safety. First, it was both observed by researchers and reported by officers that other drivers do not respond correctly or safely to a police siren. Second, there appears to be little respect by the public for crime scene tape. It is recommended that a two pronged approach be taken – first to determine if different siren wails and yelps could be used to improve the public's ability to locate emergency service sirens and second that a series of public service announcements be developed to educate the public on both the correct way to respond to a siren or crime scene tape.

In conclusion, the JIBC will work in partnership with BCIT to develop projects and initiatives from the recommendations and are willing to support any cross departmental forum that wishes to take on any of the more significant issues identified.

1. Background

Today's police officer works in a very different environment from a police officer's world twenty years ago. Rapid advances in technology have given police officers additional enabling technology to assist them in conducting their duties. From sophisticated communications equipment and laptops in police vehicles to radios, cell phones, body armour and Tasers that are worn on the body – the police officers tool kit is ever expanding. Unfortunately, unlike the construction worker, these tools cannot be put into a tool chest in the back of the truck to be brought out when needed. All need to be close at hand and some need to be immediately accessible and usable while driving – for the protection of the police officer and for the protection of members of the public. In today's world, the police vehicle has become a mobile office space. At the same time police officers have become more diverse. With more females and a more ethnically diverse population choosing policing as a career, police officers now come in a wide range of sizes and shapes and some people are entering policing at a later point in their life, with bodies that are not quite as flexible and fast to recover as they were at age twenty Integrating the above factors in a way that keeps police officers safe and up to date, presents unique challenges to today's police departments. ***Approximately 50% of total Work Safe claims by BC police officers between 1997 and 2005 are either motor vehicle accident (MVA) or MSI injury (MSI) related.*** Claims data is not specific enough to determine if these injuries relate to the increasing amount of technology that police are being asked to integrate into their uniforms/duty belts and, within police motor vehicles - though some officers, when asked, believe they do.

2. Purpose

The purpose of this project is to identify issues in co-operation with police service members that will be used as a basis for further work on developing solutions to a number of the problems identified in this study.

3. Methods

This project began with a literature review to determine the range of technologies currently used in the police vehicle or carried by a typical patrol officer. Also reviewed were methods and conclusions of other groups looking into ergonomics of the police vehicle. This was followed by researchers going on ride alongs to observe, first hand, what a typical shift looks like for both uniformed and plainclothes patrol officers. The information from the literature review and the observations from the ride alongs were then used to develop a focus group format. A series of three focus groups were then carried out. Two were done with the Vancouver Police Department with members ranging

from 1 to 20 years service, with the average being 7.7 years. Of the 12 participants four were female and 8 were male. The third focus group was with Justice Institute of British Columbia (JIBC) recruits. The JIBC recruits were between 3 and 12 months into their training, with the average being 8 months. Thirty three recruits participated in the focus group discussion. Twenty three completed the questionnaire, with the remainder not being able to because they had to leave right after the discussion for another scheduled activity. Recruits ranged from future VPD, Victoria, Delta, Abbotsford, New Westminster and West Vancouver Police Department members. Other lower mainland police departments, including the Royal Canadian Mounted Police, were invited to participate. While interested, they had to decline due to shift scheduling conflicts which made it difficult to bring groups of officers together at the same time for the required length of time.

The focus groups consisted of two parts: 1) A questionnaire and 2) brainstorming and discussion. The questionnaire and focus group format can be found in (Appendix Two).

4. Discussion

4.1 Ride Alongs

The ride alongs and focus groups carried out in the course of this project identified a number of issues that could be addressed to improve the health, safety, effectiveness and comfort of police officers while on the job. In each shift, the researcher rode with four to six patrol officers, both uniformed and plainclothes. All officers were vocal around what worked for them in the vehicles and their equipment and what did not. Areas generating the most discussion were:

- the computers and computer mounts
- the centre console with the lights and siren control
- the seats,
- the lumbar supports and
- the amount of equipment they carry on their duty belts, some of which end up in the small of the back
- the single arm rest (not popular) vs. the dual arm rest
- the (radio) mike and
- Visibility.

All officers were quite unified in their opinions on the issues listed above, other than visibility and the light bars. This last issue tended to be a concern for the taller officers, but not for the shorter officers.

The results of the ride alongs were used to develop the focus group format. Notes on the ride alongs can be found in Appendix One.

4.2 Questionnaires

The questionnaires were based on work done with the Michigan police by Sheila Cowles of the Michigan State Police and the Michigan State Police Precision Driving Unit. (2009 Model Year Police Vehicle Evaluation Program). A 1 to 5 Likert rating scale was used where 1 = highly functional/comfortable and 5-not functional/comfortable. All items ranked at $\leq$ 2 were flagged an item respondents were satisfied with. All items ranked $\geq$ 4 were flagged as an item respondents were dissatisfied with.

The responses from the two VPD sessions were combined for a total of 12 questionnaires completed. In the overall category (male and female combined) VPD group not a single item was put in the dissatisfied with category with 11 of the total of 46 items being categorised in the satisfied category. When the males were separated from females, 8 items were ranked as satisfactory and 3 items were ranked in the dissatisfactory.

There were 23 completed questionnaires from the JIBC recruits. In the overall (male and female combined) JIBC group only 2 of the total of 46 items were ranked satisfactory and none were ranked dissatisfactory. When males were separated from females, the males ranked 3 items as satisfactory and 1 as dissatisfactory while females ranked 1 as satisfactory and 4 as dissatisfactory.

In comparing the results between what was heard and observed in the ride alongs and what was discussed during all three focus groups, that took place in the VPD based focus groups, there was a lack of alignment between the weighted results and the discussions that took place.

There are two possible reasons for this:

- In reviewing the data in detail it can be seen that the responses' range is, for almost every single question, 1 to 5 and that the responses are scattered relatively evenly across the entire range – with the result being that the average of the results is close to 3 neutral. This indicates that each of the issues addressed is genuinely an issue for some of the respondents and is genuinely not an issue for others.

- The culture of police work is such that, while police officers may feel comfortable voicing their opinions, they temper their comments when asked to quantify them on paper. This does not imply that they are reluctant to 'complain' on paper, but could be that when asked to weight their own personal complaints within the context of their world and experiences, their 'complaints' seem small compared to what they see every shift.

Having said this, in the discussions it did become apparent that the officers, male or female, recruit or with 20 years of experience agreed – cohesively - on certain pieces of equipment being a challenge to work with or, in some cases, to work around (literally)!.

4.2.1 Summary of Results

Summaries of the results for the overall VPD Group and overall JIBC group are shown below in the figures below.

Items receiving Satisfactory Ranking (≤ 2)	Items receiving Unsatisfactory Ranking (≥ 4)
Function • Seat forward/backward adjustability • Driver's seat back rest tilt • Leg room • Backlight on laptop • Sun visors • Headroom • Seatbelt when sitting • Steering wheel size and adjustability • Side window visibility Comfort • Leg room • Head room	• none

Figure 1.1: Questionnaire Results – VPD combined

Items receiving Satisfactory Ranking (≤ 2)	Items receiving Unsatisfactory Ranking (≥ 4)
Function • Seat forward/backward adjustability • Driver's seat back rest tilt • Leg room • Backlight on laptop • Headroom • Seatbelt when sitting • Seatbelt getting in and out • Steering wheel size and adjustability • Front windshield visibility with above car mount • Side window visibility Comfort • Leg room • Head room • Seatbelt • Steering wheel size and position	• none

Figure 1.2: Questionnaire Results – VPD Males

Items receiving Satisfactory Ranking (≤ 2)	Items receiving Unsatisfactory Ranking (≥ 4)
Function • Leg room • Armrests • Mike position on driver's side • Head room Comfort • Head room	Function • Siren and light control • Duty belt interferences when getting in and out of car Comfort • Laptop adjustability

Figure 1.3: Questionnaire Results – VPD Females

Items receiving Satisfactory Ranking (≤ 2)	Items receiving Unsatisfactory Ranking (≥ 4)
Function • Driver seat forward/backward adjustability • Backlit keyboard for laptop	• none

Figure 1.4: Questionnaire Results – JIBC overall

Items receiving Satisfactory Ranking (≤ 2)	Items receiving Unsatisfactory Ranking (≥ 4)
Function • Driver seat forward/backward adjustability • Backlight on laptop Comfort • Spotlight	Function • Laptop adjustability

Figure 1.5: Questionnaire Results – JIBC Males

Items receiving Satisfactory Ranking (≤ 2)	Items receiving Unsatisfactory Ranking (≥ 4)
Function • Driver seat forward/backward adjustability	Function • Duty belt does not interfere when sitting in car Comfort • Laptop adjustability • Duty Belt comfort when sitting in car • Mike positioned on passenger side of laptop

Figure 1.6: Questionnaire Results – JIBC Females

4.3 Focus Group Discussions

The focus group format was developed from what was discussed and observed in the ride alongs. Topics covered were: equipment layout and use inside the vehicle (computer and mount, the centre console, the seat), plus visibility issues. After being presented with the question, participants were given the opportunity to quickly list their experiences and/or opinions, after which group discussion was encouraged. Once discussion slowed the subject was closed off by having all the participants get up and mark, using dots, their three top priorities in the final list generated. Participants were given the freedom to allocate their three dots per question as they choose – so if one item was particularly relevant to them, they could allocate all their dots to that one item.

Those items receiving the most dots for each question became the 'key issues' described in the next section of this report

The conclusion of the focus group was an exercise in which the participants were asked to describe their 'dream' police vehicle. The results to this question were not ranked and all contributions are summarized in Section 4.6 of this report.

4.4 Description of Key Issues

While the focus of this project was to identify areas for improvement, the discussion in the focus groups including older officers often included stories that started "If you think this is bad, back when I started 15/20 years ago..."

An example of this was around the discussion of not easily being able to reach the air conditioning controls in the current vehicles because they are obstructed by the computer/computer mount. One officer brought up memories of being a recruit - when the vehicles didn't have any air conditioning at all and the ventilation vents (which could have provided fresh air) were punched out so the ventilation shaft could be used as a baton holder.

It must be noted therefore that, despite the fact that there is always room for improvement, police vehicle design and layout has already come a long way. There is a greater awareness of ergonomics than even ten years ago and a commitment on the part of departments to provide their members with better and better equipment and vehicles. Also, most police departments now place an emphasis on keeping physically fit and flexible and provide excellent workout spaces and access to fitness trainers to their members. This latter trend is as important as providing officers with the better equipment and vehicle setups.

The majority of the key items identified focus on vehicle design and layout related issues (see section 4.4.1). Two items were identified relating to the duty belt (see section 4.4.2). Finally, two additional safety issues were identified that are not directly vehicle or equipment design related, but are mentioned as they are issues for which there are potential solutions and would have a positive impact on the both the health and safety of officers as well as the public (see section 4.4.3).

4.4.1 Vehicle Related Issues

4.4.1.1 Computer and Computer Mount

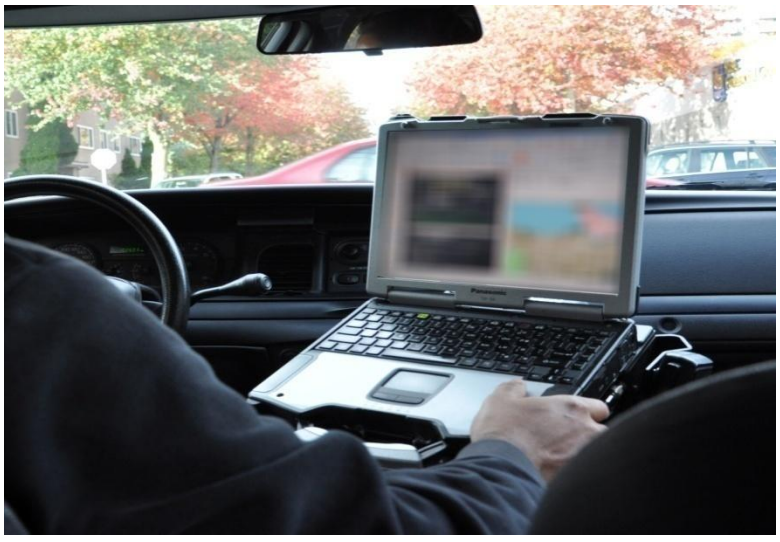

Figure 2: Typical setup for police cruiser

The computer and computer mount were, by far, the number one issue identified. It provoked the most responses during focus group discussion, garnering the highest number of dots and coming up across a number of the topics discussed.

On the plus side, officers like the:

- size of the computer screen,
- backlit keys and
- ability to change the screen from daytime viewing to night time.

Of concern were the location, height, adjustability, and amount of movement in the computer mount – when fixed in place - were all concerns for participants. While the members are quick to point out their chief complaints are with the new turret mounts – the also added that the old computer mounts were not ideal either.

Specifically:

- The new mounts are higher than the older so that visibility is restricted to the front of the vehicle and to the right hand side (for the driver).
- All computer mounts require the user to twist the body to one side to use it. While the new computer mount has reduced the amount of twisting, it has not eliminated it. This is compounded by equipment on the duty belt, which digs into the body when you twist in the seat.
- The computer/computer mount restrict access and a view of the centre console. Several officers spoke about having to snake their hand and arm under the computer and mount to operate the lights and sirens.
- VPD officers are concerned that, with the amount of movement in the new turret system and the fact that it sometimes releases from the position it is fixed in that, the computer could become a projectile in the event of an impact.

Note: There are new mounts coming out that address this last issue

4.4.1.2 Centre Console (Lights and Siren Control)

Figure 3: Centre Console - note flat buttons and partial coverage by computer

A close second as a key issue is the centre console.

The large size, sharp edges and lack of tactile feedback on the controls make it an unpopular addition to the car.

Of these the lack of tactile feedback is the most serious. The on/off buttons for each function are flat and difficult to differentiate from one another. Moreover, a clear view to the console is often blocked by the computer, which typically sits over the console.

This has a number of consequences. First, in order to operate the lights, siren, air horn and other equipment from the console requires that the officer look down at the console to turn a switch on and off – which is dangerous when driving. Second, the officers either have to shift the computer over to comfortably reach the console or they snake their arms under the computer to reach the furthest controls.

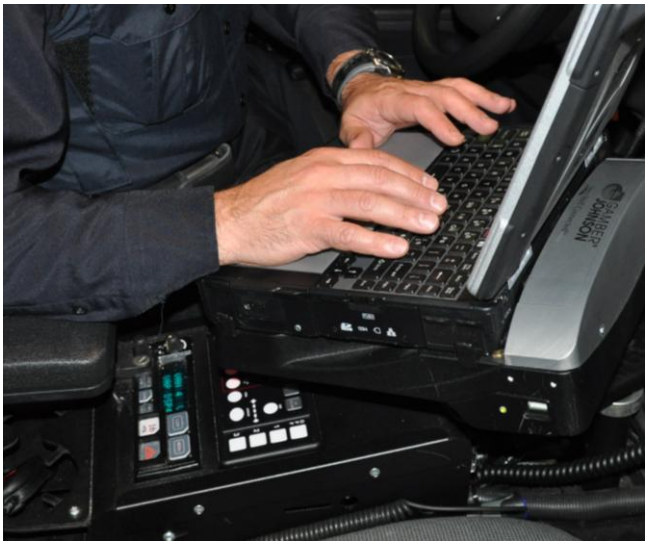

Figure 4: Computer partially blocks access to console

The toggle switches used in the past were mentioned repeatedly as something that worked very well – because they were easy to reach and could be operated by touch alone.

Note: Ford is working on moving critical keys from console to the steering wheel (lights and siren, lights only, rear lights and push to talk radio). New versions of the console (not yet available) also have tactile stitches.

4.4.1.3 Arm Rests

Figure 5: Left – old dual arm rest; right new single arm rest

The arm rests are used quite a bit by officers. It was made clear that the (old) dual arm rest is preferred over the (new) single arm rest.

Officer use the dual rest to stabilize themselves by putting their elbow between the armrests, which also puts their arm in a lower, more optimal position when typing on the computer. The higher single arm rest puts their arm/shoulder and back in an uncomfortable position when they use it.

While the complaint is about the arm rests, it is exacerbated by the position of the computer - which forces the officer to lean over and place elbow in best position to access the computer.

4.4.1.4 AM/FM Radio Controls and Air Conditioning Controls

Figure 6: AM/FM Radio, heat & air conditioning controls

The computer and mount blocks easy access to the controls for the AM/FM radio and the air conditioning. Accessing these requires awkward postures.

4.4.1.5 One Person vs. Two Person Car Layout

Figure 7: Two persons in a two person car layout

Figure 8: One person in a two person car layout

VPD cars are laid out for two person use but are also used by single occupants. The equipment and control layout is set up for use by both the driver and the passenger in the front seat, so the resulting workspace is spread over a greater area than if there were only one occupant.

Figure 9: Occupant driving while viewing computer screen

This makes it awkward when the car is assigned a single person who is now required to operate controls and equipment from the driver's side of the car.

4.4.1.6 Lights/Light bar Options

Figure 10.1: Standard light bar

Figure 10.2: Low profile light bar

Figure 10.3: In-car light bar

Figure 10.4: Above mirror light bar

There is currently a wide range of light bars available for installation in police cars, with the current trend of moving to a lower profile light bars on the roof of the car or moving the light bars to the inside of the car.

There are two concerns that emerged on the subject of light bars. First, for the behind visor light bars tall officers are concerned that, in an accident, they could sustain an injury from the behind visor light bar. Second, a number of visibility issues emerged.

Figure 1 1: Impact of In-car light bar on visibility and relationship to head height

Because visibility was discussed as a separate topic – the impact of light bars on visibility will be addressed in the visibility sections.

4.4.1.7 Visibility: see out of windows

Figure 12.1: Unobstructed view outside window – note space between top of rear-view mirror and car roof

Figure 12.2: View outside window with in-car light bar – note line of sight ends just above rear-view mirror

A number of pieces of equipment inside the police vehicle reduce the line of sight both to the front of the car, as well as out of the right hand window.

Specifically:

- All in car light bars restrict vision to the front of the car, with the behind visor light bar having the most significant impact. In addition to the light

bar itself restricting the line of vision, the behind visor light bar also prevents the visor from being fully extended, further restriction vision to

- The computer partially blocks the view to the front and the view to the right.

Figure 13.1: View out right hand mirror with laptop closed

Figure 13.1: View out right hand mirror with laptop open

- The in car camera partially blocks the view to the front – typically along the line of vision to traffic lights.

Figure 14: Above mirror lights and in-car camera in line of vision to traffic lights

4.4.1.8 Visibility: Visibility of Police Vehicle

With light bars going lower profile or being moved into the car, the profile of a police vehicle is reduced. Overall visible identification of the car as a police vehicle becomes difficult, in particular during the day – when the reflective identifiers are not visible. This has its benefits, but also presents some problems.

Figure 15: Example of visibility of a police vehicle with a standard light bar (left) in comparison to a low profile light bar (right)

At night the lights located inside the rear window become invisible when the back trunk is opened (as is often the case at a crime scene). In this case the police car becomes virtually indistinguishable from an ordinary car since the only lights identifying the car as a police car to the rear are those in the back window.

As sirens are either not being heard by the public, or being ignored the lack of visibility of the car it presents risks to officers and to the public. This is discussed further in 4.4.3.a: "People doing everything but pull over to the right when they hear a siren"

Also mentioned was that, these days it has become very difficult for the public to distinguish between security company cars and employees and police cars and police officers since they have cars and uniforms that have look remarkably similar to those used by the police service.

4.4.1.9 Sirens

As with the light controls, the siren controls are located on the centre console are difficult to activate without looking at them. This has already been addressed in section 4.4.1.

Sirens are sometime not heard by the public – due to a combination of factors. From being drowned out by in-car radios, to the wail used by the police potentially being difficult to triangulate by the human ear, to the siren's wail itself being dampened in the front engine compartment of the car – all these things are potentially contributing to the public being unaware of where a police car is and where it is coming from. This can be hazardous to both the police officers in the car, as well as to the general public.

There appears to be a general public awareness, in the Lower Mainland, as to what the correct procedure is when driving and hearing a police siren. This is discussed as a separate issue in section 4.4. 3.

4.4.1.10 Seats

A variety of issues arose on the subject of seats. The chief complaint relating to posture and back comfort was that the foam in the seats eventually bottoms out and after time the seats begin to list downward toward the console.
Some of the recruits reported riding in cars where the foam in the seat had bottomed out to the extent that their sitting height was reduced and they can't see as well out of the windows.

Figure 16: Seat foam, bottoming out

The foam also begins to tear away if the upholstery is ripped which often happens on the right hand side of a seat – where most members wear their guns. Considering the amount of time an officer sits in a car, an uneven sitting surface, compounded by the gear worn on the duty belt – an uneven sitting surface can be a challenge.

Figure 17: Seat upholstery and foam ripping

Finally, in cars with cages and in the wagons, seats have limited adjustment - in particular for the tilt back (which tall persons need to help them to better sit in a car)

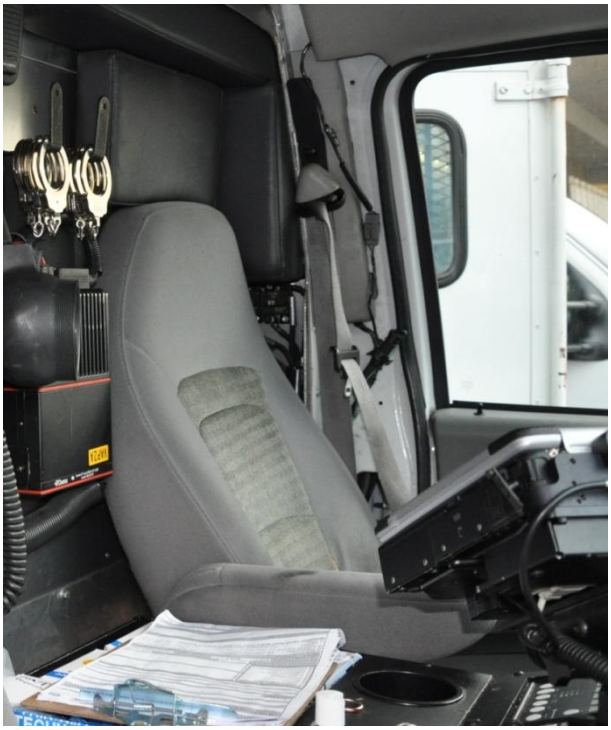

Figure 18: Wagon seat has no backrest adjustability

The electric controls of the seats were also mentioned but are discussed under a separate item in section 4.4.1.13.

4.4.1.11 Loose Items in Car and Wagon

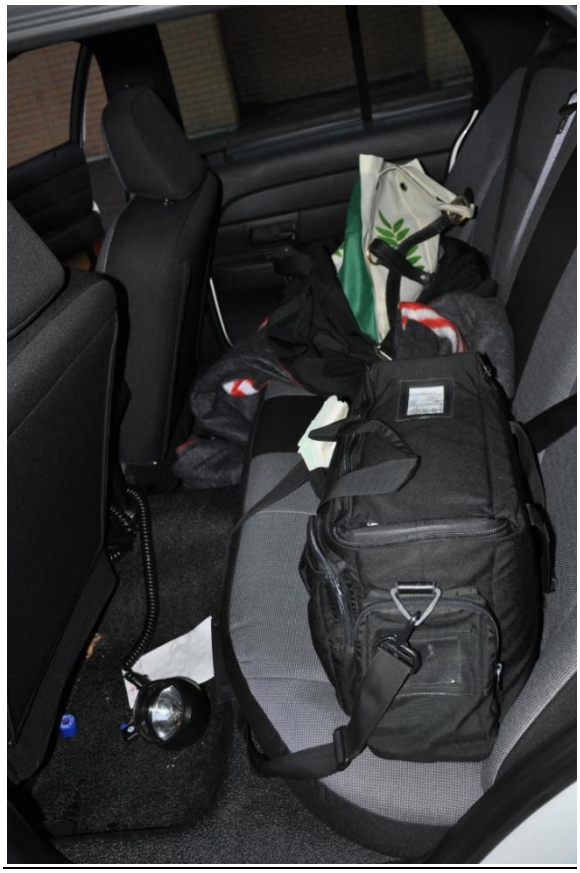

Figure 19: Typical example of what officers carry with them each shift

There is currently no way of organizing notebooks, bags, pens and other extra gear officers carry with them within the cars or the wagon. Loose items sliding or flying around in the car is a problem. This poses safety problems as well as impacts an officer's ability to work efficiently (if their stuff is scattered about).

4.4.1.12 Education of Police Recruits on Headrest and Seatbelt Height Adjustments

Figure 209: Seat headrest adjustments (arrows) and seat belt height adjustment feature (circled)

Currently officers typically start their shift without adjusting their headrest height or seatbelt height adjustment. When asked, many of them didn't know how or why these should be adjusted. Injury, in case of an accident, can be reduced if the headrests and seatbelts are adjusted properly.

4.4.1.13 Electric Adjustments – Seat and Mirror

Comments regarding the electric controls for both the seat and mirror are that they are slower than manual controls, which is frustrating for some members.

In addition, at times the seat controls do not work properly so that adjusting a seat to the correct position becomes impossible.

No mention of mirror controls not working was made.

4.4.1.14 Door Locks' action on some vehicles is reversed

Figure 21: Door locks – Different styles where same action that unlocks the door in one style, locks the door in the other style

Some vehicles have the action which locks a door opposite to others. In these vehicles 'locking' a car door actually unlocks it and vice versa.

While not an ergonomic risk factor, this is something that causes problems for officers. Potentially locking a door when intending to unlock it, or vice versa could pose safety problems for an officer (e.g. accidentally locking themselves out of a car)

4.4.1.15 Organization of Trunk in NCO Vehicles

Figure 22: Typical NCO's trunk

NCO's vehicles carry extra equipment not carried by regular members, for example fire extinguishers and large first aid kits and crime scene kits. These are stored in Rubbermaid containers and nylon bags.

It was pointed out that storage space (optimal space usage); organization (what was stored where) and currency (e.g. expired fire extinguishers) were all issues in NCO cars.

4.4.1.16 Hooks in VPD police wagons

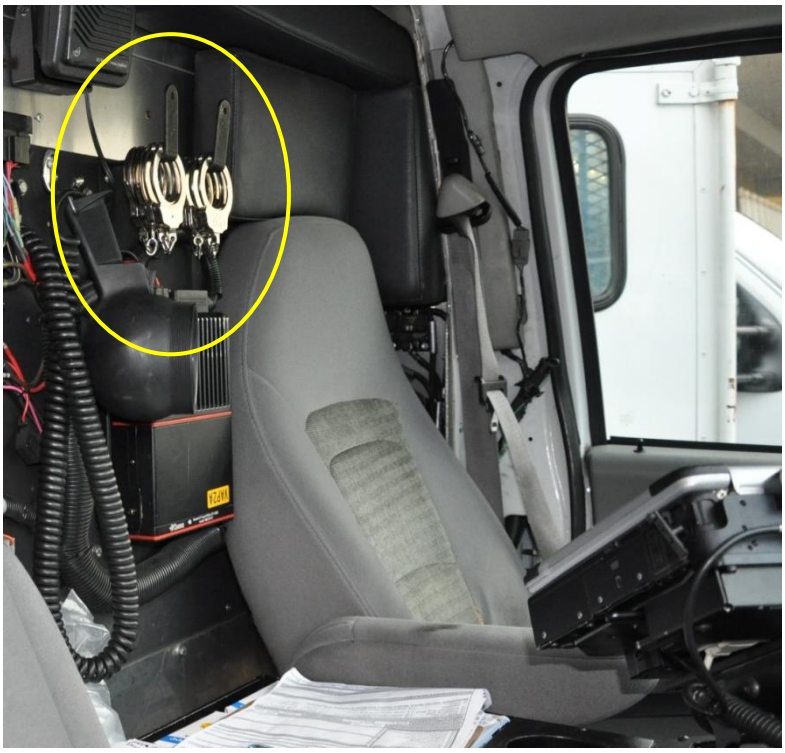

Figure 23: Handcuff hooks in wagons

VPD wagons have hooks at head height that members are concerned could injure them if they were thrown against the hook with any force. No one was able to come up with a purpose for the hooks or a rationale as to why they are placed where they are. (Note: It was later determined that the hooks are for hanging handcuffs on)

4.4.2 Equipment/Duty Belt Related Issues

4.4.2.1 Duty Belt and Equipment for Plainclothes Officers

The common refrain with respect to the duty belt (other than material, which is discussed below) is the amount of equipment that an officer carries these days. If all of it is placed on the duty belt, some must be placed in the hollow of the back – unless the officer has a significantly wide girth (which potentially points to a completely different health risk). In particular, this puts the back in a position of poor posture when sitting in the car – especially if there is a lumbar support in a seat. Some officers reported removing the lumbar support of the seat to improve sitting comfort. These problems are compounded for officers with small waists and for plainclothes officers. The plainclothes officers said they would appreciate guidelines as to where best to wear/place their equipment. While plainclothes mentioned this specifically, previous focus groups in an unrelated project have identified similar issues with uniformed officers.

4.4.2.2 Leather Duty Belt vs. Nylon

Some officers had been supplied with leather duty belts as recruits. Almost all prefer to use the nylon duty belt, noting it is more comfortable as well being perceived as being more practical.

4.4.3 Other Issues

4.4.3.1 "People doing everything but pull over to the right when they hear a siren"

Both in the ride alongs, as well as in the focus groups there was some discussion about how, in the Lower Mainland, people do not pull over properly when they hear a siren. There appears to be unawareness in the general public as to how to safely pull to the side when they hear a siren. This could be compounded by police car's profiles becoming less visible with lower profile light bars on the outside and lights being mounted inside the vehicle and behind grills.

This is a safety issue both for police officers as well as the public and is potentially relevant to other first responder groups as well

4.4.3.2 People walking under crime scene tape

Perhaps, most surprising, it was observed during one of the ride alongs that pedestrians (at a crime scene) regularly pushed the 'Police Line Do Not Cross' tape up and walked right into a crime scene. On being confronted by officers, almost all persons acted completely surprised that they were in the middle of the crime scene (despite having just lifted the tape and ducked under it). Others became belligerent at being asked to get out of the crime scene and walk around it. One officer commented it is not at all uncommon to see this.

This complete lack of regard for the authority of crime scene tape has a number of ramifications, for officer safety, for civilian safety and for crime scene integrity.

In one discussion on this it was commented that perhaps people confuse crime scene tape with construction tape (as it police tape is yellow in Canada, as opposed to white and blue or other colours used in other countries). Even if this is the case, this means that persons would be just as likely to walk under construction tape and end up under a crane load or at the bottom of a manhole (potentially injuring a worker in there...)

While not directly related to officer safety in the car, this behaviour must be noted as it has widespread occupational and community safety ramifications across police, public works and the construction sectors.

4.5 Dream Vehicle

While there is no dream vehicle on the road, or even on the assembly line, posing this particular question in design related focus groups sometimes ends up identifying one or two very novel ideas which are relatively easy to implement but that never would have occurred either to a car designer or a fleet vehicle manager. The list of features below combines the comments of all three focus groups. Personal comfort items were relatively low on the wish list – almost all ideas would result in improving professional effectiveness and safety.

- Emergency lights on side mirrors and on push bars and inside the back trunk
- Mount siren on front push bar (will make it more audible outside and decrease inside cabin noise - RCMP is now apparently doing this, after doing a study on the issue)
- CPIC license plate scanner as a standard feature that alerts you if it finds something
- Scale down size of all aftermarket equipment – except laptop
- Move some of the controls for lights, sirens, computer, radio, a/c to steering wheel
- Move radio and a/c controls (perhaps to steering wheel) and move computer and computer mount into the resulting space
- A computer that can be moved right in front of officer
- Voice controlled computer and mike
- Heads Up Display
- Bring back the dual arm rests
- Brighter headlights
- Side air bags
- Winter Tires for the winter (need them even if the main roads are cleared, since side streets are not, requiring you to chain up is you have all seasons)
- 4 Wheel drive or All Wheel drive.
- Swivel Chairs
- Some kind of sound management system inside vehicle (sometimes they can't hear dispatch or dispatch can't hear them when the siren is on – apparently the dog cars have a solution…..)
- Ballistic panels in doors
- Push Bars (welded to body)
- Distance sensor you can turn off (like the German police have) or have a rear back up camera or beeper
- Bluetooth enabled car
- CD players or MP3 jacks in cars
- Cell phones in the car
- Rain shield for partially open window
- Remote door locks
- Heated seats
- Outdoor temperature in the rearview mirror
- Bring back the black and white cars (highly visible, look cool)
- More interior space
- SUV 's

4.6 Recommendations regarding Key Issues

This section takes the key issues identified in the previous section and groups them into categories, discusses potential solutions. These range from future projects to educational initiatives to strategic initiatives within police departments. Some solutions are relatively simple to initiate (for example modifying procedures), others are quite complex (requiring significant resources and dollars). The recommendations are discussed under three different themes: Vehicles, Duty Belts and Equipment and Outside Influences.

4.6.1 Vehicle Recommendations

4.6.1.1 Develop a strategy to review equipment for both component effectiveness as well as how components work in combination with the other items as part of typical work flow

The components listed below generated the most discussion:

i. Computer and Computer Mount
ii. Centre Console (Lights and Siren Control)
iii. Light bars
iv. Visibility being blocked by equipment in the car
v. Arm Rests
vi. AM/FM Radio Controls and Air Conditioning Controls
vii. One Person vs. Two Person Car Layout

Figure 24: Typical view of driver seated in car

The item specific concerns have already been listed in Section 4.5. In addition to those concerns there is a broader concern regarding how each of the above items interacts with the others problems during work flow.

For example – not only can you not control the centre console without looking at it when you turn on the lights and sirens or air horn (dangerous in itself) but in many cases the computer is blocking the view when you do glance down at it.

Or

The new computer mount is designed to reduce twisting of the back when using the computer by allowing it to be used in a better posture. However the new solid centre arm rests negate a part of the benefit by requiring the officer to hike the arm and shoulder when typing on the computer and resting their elbow on the armrest.

Recommendation:

- That the design of the computer mounts is reviewed, a hazard analysis is done and a new mount be sourced.

  That the centre console either be modified so that a person can easily identify each of the buttons by touch alone and/or that the centre console design is reviewed to see if not only the tactile element of the buttons can be improved, but that the console itself is shrunk down in size. The latter solution would be more cost and time intensive but the result could end up providing more space for a more effective computer mount.

- That lines of site are considered in the installation of any equipment in the vehicle cockpit and that solutions are chosen that maximise lines of sight and visibility whenever possible.

- That the old dual arm rest provides the ergonomic benefit to members and police departments should consider going back to them from the current configuration.

4.6.1.2 External Visibility of the Police Vehicle

The 'invisibility' of a police car has its pros and cons, so strategies to increase visibility must be considered carefully. Marked cars are quite visible at night – due to the use of reflective marking, but it is possible to work on making marked vehicles both more identifiable during the day – if only to differentiate them from security company vehicles. Other alternatives which would not change the markings of the

cars are to consider the placement of both the light bars, sirens and siren wails chosen for different emergency situations.

Recommendations

- Review what other municipalities/police organizations have done to address this issue. The RCMP has recently moved the siren on the front push bar both increases audibility – reducing in cabin noise in the process.

- Determine if alternate wails could be used to improve triangulation. If research has not yet been done this is a relatively easy project to carry out as part of establishing standards of practice in the lower mainland.

- Finally, those departments that have not yet done so, add lights to the side view mirrors, push bars and inside the trunk lid. This expands the 'envelope' of the vehicle so that the car is seen occupying a larger visual space is seen sooner and is more clearly identifiable.

4.6.1.4 Seats

The issue of car seats, how the upholstery and foam wear, how they contribute to poor sitting posture in the car and how their adjustability, or lack of it, contribute to back pain or musculoskeletal injury is a very complex issue. Solving the problem of finding a functional, durable car seat for police cars is one that would require the co-operation of police departments and the automotive industry – something that is both costly and logistically challenging.

Recommendations

Short term:

- Encourage Police Departments to conduct an Audit of police vehicles with special emphasis on seats.
- Ensuring seats are always in good repair and are not listing
- Replacing seats when bottoming out or listing
- Looking at a retrofit to make a more adaptable interface between officer and the existing seat that would be cheaper to replace once a seat has started to deteriorate.

Long Term:

- Develop a joint labour/management committee to track best practices in police vehicle ergonomics. This could be a sub-committee of current Health and Safety committees.

  This will give those advocating for better seats specific , documented examples of what needs to be done to improve the sitting posture and function of police officers in their 'mobile offices'.

4.6.1.5 Loose Items in Car and Wagon

Recommendation

This is a relatively easy item to address.

However, finding an optimised solution must begin with a realistic survey to comprehensively determine what is carried inside the car by officers, how and when these items are used and only then choosing a solution or changes in procedures to solve this problem.

4.6.1.6 Education of Police Recruits on Headrest and Seatbelt Height Adjustments

Recommendation

After completion of the focus groups it was determined that this is included in the basic driver training. The focus groups helped identify that retention of this safety procedure is poor. It is therefore recommended that this be stressed at every stage of driver training so that it becomes one of the first things an officer does on getting into the car.

Note: This should have an added public benefit that officers aware of safe seatbelt and headrest adjustments can also help educate the public at roadside checks and baby seat clinics about headrest and seatbelt safety.

4.6.1.7 Electric Adjustments – seat and mirror controls are slow and sometimes don't work and door locks' action on some vehicles is reversed

The electric adjustments and locks are determined by the car manufacturer and there is little that can be done to improve this at the department level.

Recommendation

- Departments should ensure that these components are quickly repaired when not working.

- If possible, rewire the door locks so that the locked/unlocked motion is consistent across the fleet.

4.6.1.7 Organization of Trunk in NCO Vehicles

Recommendation

Review what is carried in the NCO's trunks and then:

- Develop an optimized organizational system
- Provide clearly marked, easy to open and close, containers
- Implement a regular maintenance system of for equipment and expirables.

4.6.1.7 Hooks in VPD wagons

Recommendation

Post focus groups it had been determined that the hooks are meant handcuff storage.

- Relocate the hooks in the cab to a place where they pose less of a risk in case of an impact.

4.6.2 Equipment and Duty Belt Recommendations

Note: Uniforms are subject to regulations under the BC Police Act. The relevant section of the Act has been included in Appendix Four. This Act was originally written in 1976 and subsequent amendments to it have not included language supporting the use of functional or ergonomic designs. Addressing some of the uniform and equipment related issues would be easier for municipal departments if the Uniform Section of the Act would allow departments to include functional and economic criteria in their choice of uniforms.

Recommendation

That the Provincial government to examine this regulation and update it to include ergonomically beneficial equipment.

4.6.2.1 Duty Belt and Equipment for Officers

Review options for equipment placement on duty belt. See if other jurisdictions have standards or protocols to optimise placement for different person sizes - for uniform and plainclothes.

Recommendation

If none exist, this is another area where a small project could be done working with officers to clearly identify issues and challenges to come up with possible solutions.

Determine if there are some established solutions for plainclothes officers.

For the uniformed officers, numerous suggestions were made in all three focus groups, suggesting solutions are out there – it remains for someone with the authority to do so to champion this.

4.6.2.2 Leather Duty Belt vs. Nylon

Recommendation

Determine why some departments still use leather belts and whether this rationale is consistent with ergonomic considerations.,

4.6.3 Outside Influences

4.6.3.1 Public Service Announcement on "What to do when you hear a siren"

Both in the ride alongs, as well as in the focus groups there was some discussion about how, in the Lower Mainland, people do not pull over properly when they hear a siren. While not directly relating to equipment or vehicle ergonomics, this is a safety issue that is relevant not only to police, but also to other first responder groups.

Recommendation

That a public service announcement (PSA) campaign be implemented educating the public on what to do and what not to do when they hear a siren.

4.6.3.2 People Walking Under Crime Scene Tape

While not directly relating to equipment or vehicle ergonomics, this is a safety issue that is relevant not only to police, but also to public service workers and to the construction industry.

Recommendations

There are a couple of potential approaches to be taken here:

- One would be to use a crime scene tape that is a colour other than yellow (such as the blue/white used in some countries).
- Other tactics could include a double row of tape – one at waist or chest height and a second about 1 m off the ground.
- Finally, PSAs on this subject could be done as well.

5. Final Comments

While there was a discrepancy between the results in the questionnaires and both the ride alongs and the focus groups, the comments and observations made in the focus groups and the ride alongs are entirely consistent with one another. Moreover, in observing the work and the key complaints, the researchers have been able to confirm that many of the officer's concerns are valid and real. For example, operating the light and siren buttons, with the computer and computer mount in the way can put the arm and shoulder in a poor position. It is difficult to blindly tell apart one siren or light button from another and the inside light bars and camera do impact the line of vision. Further studies could be done to validate a number of the key issues identified. However it is not necessarily cost-effective to pursue further study on some of the issues that have low cost, common sense solution. These have been identified above and could be perused by individual departments by tackling them as part of their strategic and operational plans over the next years. Other key issues can be addressed in stand along projects. These have also been identified with solutions. Finally, some issues, like those of the car seats will require extensive further study and co-operation from the automotive industry. Projects of this scope would be better championed by a cross department forum such as the Ford Motor Company's Police Advisory Board.

The JIBC, in partnership with BCIT will work to develop projects and initiatives from the recommendations and are willing to support any cross departmental forum that wishes to take on any of the more significant issues identified.

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Photo Credits: Yvette Jones

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Ergonomics and Safety in Law Enforcement

Appendix One: Summary of Key Points from Ride Alongs

Notes from mid-October 2009 Ride-along

Teams were :

- Plainclothes officers working in pairs (8 years combined experience) – older vehicle (102,585 km on car) – 3 accidents (airbags did not go off but probably should have for one of them).
- Dayshift is 60% single officer cars, 40% double; nightshift this is reversed.
- single uniformed officer – new vehicle
- Note: cars are hot-seated (used on every shift) – as a result most officers do not bring

Plainclothes:

Duty belts:

- They get in the way of being able to sit properly in the seat.
- Each uniformed officer carry Tasers, 2 cuff pouches, gun, radio, 2 mag lights, notebook
- Plainclothes officers carry one less mag, different holster, one set of cuffs and only one of the officers in the team carries a Taser.

Ingress & egress – getting in is harder than getting out. There's a lot of adjustment required to get comfortable. The gun hits the arm rest and Taser hits the leg (plainclothes officer).

Crown Vics are heavy and feel solid so officers feel pretty secure (reference to accidents).

Officers work 4 days on 4 days off; partners split the driving at 2 days each, passenger writes reports during shift – there are times that officers get carsick.

The vehicle – there is lumbar support in the seat on the driver's side only.

Aches and pains at end of shift: if you've been sitting for a long time it's like being in an airplane.

Would they like a hands free or voice activated system? Ans. It would be nice to have key console items on the steering wheel and a secondary set that the passenger can access. The console is horrible to access.

Computer mount moves over to passenger side: passenger responsible for computer and communications. It would be nice to have the mount able to swing further (telescoping) to use properly when parked. It would be interesting to know what would happen to the computer should the airbags go off. Computer work – touch screen

Old cars: mounts move up and down but very little side to side. Console, the driver needs to control the lights/siren etc.

Seats: both seats have buckled (passenger side has buckled to the left, drivers side has buckled to the right) due to officers leaning over to access computer.

Body Armour is Level 2 from pacific Safety Products

Issue- on sunny days the screen is hard to read

Issues – daily low back pain

No issues with day/night switching – screen background changes to black for night driving.

Safety: stuff is usually (not always) secured in back seat with seat belt due to hi speed stops and starts.

Police wagons are 'horrible' from an ergonomics standpoint – laptop is too close to the steering wheel so hard to drive.

Uniformed officer:

Issues – officers don't want to use the new cars - they're cramped and the ROM of the laptop table is greatly reduced compared to the old cars.

Notes on upcoming cars: The seat design is not expected to change for 2010.

Nylon duty belt is used when in uniform

Dog squad console has a custom cover (by Const. Bruce Roady and Sgt Brad Brewer) so the dogs can bound off the console and out the door.
Any changes to vehicles must be approved by the City.
Look at Carbon Motors, state of the art police car "C7" its a concept car – ricaro racing seats, built in computer, etc.

Ford:

- Has Police Advisory Board
- Ford sells about 50,000 Crown Vics/year
- Dodge Charger – 8-10,000/yr
- Chevy Impala – 5-6000/yr– but RCMP took out Impala due to issues with laptops and airbags – unsafe for passenger to be in that car.
- Chevy Tahoe - 5-6000/yr

- Of all these vehicles the Crown Vic is the only one with a 75 mph crash rating, important fact for US freeway patrol.
- Chevy Caprice is being brought back out for 2011

Notes from late-October 2009 Ride-along
Initially Voiced Concerns during Briefing:

Position of Mike

(Later expanded to concerns re: both to left and to right of computer, clip effectiveness, Right mike position can shift car into neutral if you pull it up too quick)

Mobility of Laptop (too much mobility, old ones were stickier but that wasn't ideal either)

Laptop covers siren and light switches – have to snake hand in

The wagons are better than the patrol cars

The older cars were worse

(Both cars I was in were new – one only had 54K on it and was an NCO's car)

New arm rest – solid shorter and less comfortable (all users rested the elbow between (and therefore lower) on the old dual arm rest

Apparently the new armrests are linked to wanting to have decent cup holders. Opinions about armrests are somewhat linked to how much you use/like cup holders

One of the reasons they went away from the toggle switches is because the fleet vehicle managers wanted to have the cup holders.

Notes: Keep 'our' vehicle clean.

Oder cars seats and layout generally worse than newer cars

Some discussion around whether Ford will continue with Crown Vic – they like the trunk space (lots of stuff they have to have with them)

Cars with windshield camera – cameral cuts off line of vision

Siren/Light Control – prefer toggle switches as it gives sensory feedback. Current touch pads you have to look at to confirm where you – subtle design differences of pads is not enough.

Air horn is one of the things they consider to be very important – important when going through intersections since siren isn't typically heard by drivers - and yet button is located under laptop.

Some discussion around siren and light bar visibility and how visible the car is by the public. Pros and cons. However less visibility makes the air horn more important. One person recalled having read (somewhere) that the siren used in NA is not easily heard and it is difficult to determine direction – unlike the Ta Tu used in Europe and the UK.

Some guys are worried about light bars behind visors, some aren't. Alternative – light bar above mirror also limits visibility

Visibility is always a concern, more a problem for taller people

Cord on mike gets tangled (and is therefore sometimes too short) when driving/for driver.

Two young guys work out regularly, have no MSI issues and have not had a serious accident to date.

While things like the computer are mobile, most things in the car are secure enough that driver and partner are not worried about things going flying.

Airbags may or may not be turned off in a car – none too concerned about them going off – other than fingers getting squashed as the laptop is forced closed.

Appendix Two: Questionnaire and Focus Group Format

Focus Group Questions

1. What devices/features do you regularly use in the vehicle (e.g. laptop, mike, light and siren control, spotlight)?

   (Participants will be asked to pick their top 3 using stickers and the moderator will summarise the results)

2. List any injury or chronic condition that you have experienced that you believe to relate to your vehicle and or equipment.

   (Participants will be asked to pick their top 3 using stickers and the moderator will summarise the results)

3. List the features and types of equipment you think are most likely to contribute to injury or a chronic condition.

   (Participants will be asked to pick their top 3using stickers and the moderator will summarise the results)

4. What are your key concerns regarding your health and safety with respect to the visibility in your vehicle?

   (Participants will be asked to pick their top 3e using stickers and the moderator will summarise the results)

5. What are your key concerns regarding your health and safety with respect to the comfort in your vehicle?

   (Participants will be asked to pick their top 3using stickers and the moderator will summarise the results)

6. What's the best thing you've seen with respect to vehicle set up?

   (Participants will be asked to pick their top 3 using stickers and the moderator will summarise the results)

7. What's the worst thing you've seen with respect to vehicle set up?

   (Participants will be asked to pick their top 3 using stickers and the moderator will summarise the results)

8. How do you think your vehicle and equipment layout differs from the vehicle layout and equipment of police in other countries?

   (Participants will be asked to pick their top 3 using stickers and the moderator will summarise the results)

9. Describe your dream vehicle.

Background Questions – All Participants

PART 1- Background

1. How many years have you been in the police service?

2. What is your current assignment (e.g. Plainclothes, accident investigation, etc)?

3. Are you Male / Female (circle one)?

4. Do you use nylon or a leather duty belt?

   Why?

5. What type of holster do you use?

PART 2- Function

With respect to how well the following pieces of equipment / components contribute to your ability to do your job, rate the following pieces of equipment/components on a scale of 1 to 5 where:

1 = highly functional
3 = neutral
5 = not functional

1. Driver seat forward/backward adjustability
   1 2 3 4 5

2. Driver seat back rest tilt
   1 2 3 4 5

3. Driver seat lumbar support
   1 2 3 4 5

4. Passenger seat lumbar support
   1 2 3 4 5

5. Durability of upholstery
   1 2 3 4 5

6. Leg room

1 = highly functional
3 = neutral
5 = not functional

1 2 3 4 5

1 = highly functional
3 = neutral
5 = not functional

7. Arm Rests
   1 2 3 4 5

8. Cup Holders
   1 2 3 4 5

9. Siren and light control
   1 2 3 4 5

10. Adjustability of laptop
    1 2 3 4 5

11. Laptop light
    1 2 3 4 5

12. Laptop without backlit keyboard
    1 2 3 4 5

13. Laptop with backlit keyboard
    1 2 3 4 5

14. Glove compartment
    1 2 3 4 5

15. Sun visors
    1 2 3 4 5

16. Ease of getting in and out of car
    1 2 3 4 5

17. Duty belt does not interfere when sitting in car
    1 2 3 4 5

18. Duty belt does not interfere getting in and out of car
    1 2 3 4 5

19. Light bar behind visors
    1 2 3 4 5

20. Light Bar above rear view mirror
    1 2 3 4 5

1 = highly functional
3 = neutral
5 = not functional

21. Mike positioned on passenger side of laptop
    1 2 3 4 5

22. Mike positioned on driver side of laptop
    1 2 3 4 5

23. Spotlight
    1 2 3 4 5

24. Headroom
    1 2 3 4 5

25. Seatbelt when sitting
    1 2 3 4 5

26. Seatbelt getting in and out
    1 2 3 4 5

27. Steering wheel size and adjustability
    1 2 3 4 5

28. Front windshield visibility with behind visor light bar
    1 2 3 4 5

29. Front windshield visibility with above rear-view mirror mount
    1 2 3 4 5

30. Front windshield visibility with above car mount
    1 2 3 4 5

31. Side window visibility
    1 2 3 4 5

32. Rear window visibility
    1 2 3 4 5

1 = highly comfortable
3 = neutral
5 = not comfortable

PART 3- Comfort

With respect to your comfort/well-being rate the following pieces of equipment/components on a scale of 1 to 5 where:

1 = very comfortable
3 = neutral
5 = not comfortable

1. Driver Seat
   1 2 3 4 5

2. Front Passenger Seat
   1 2 3 4 5

3. Lumbar Support
   1 2 3 4 5

4. Leg room
   1 2 3 4 5

5. Arm Rests
   1 2 3 4 5

6. Siren and light control
   1 2 3 4 5

7. Laptop adjustability
   1 2 3 4 5

8. Duty Belt comfort when sitting in car
   1 2 3 4 5

9. Mike positioned on passenger side of laptop
   1 2 3 4 5

10. Mike positioned on driver side of laptop
    1 2 3 4 5

11. Headroom
    1 2 3 4 5

12. Seatbelt
    1 2 3 4 5

13. Steering wheel size and positioning,
    1 2 3 4 5

14. Steering wheel material and surface finish
    1 2 3 4 5

1 = highly comfortable
3 = neutral
5 = not comfortable

Appendix Three: Focus Group Results

VPD – Focus Group Brainstorming Summaries

1: What devices/features do you regularly use in the vehicle (egg. laptop, mike, light and siren control, spotlight)?

Group 1 (Max of 27 dots)

Computer and computer mount	9
Lights and sirens	6
AM/FM Radio console/volume knob	5
Cup holder (for cups and bottles)	4
Arm rests	2
Red interior light	
spotlight	
PA mike	
Trunk organizer	
Need something to secure loose items in car	1

Group 2 (Max of 12 dots)

Laptop	4
Mike	4
Lights and Sirens Control	3
Spotlight	
Armrest	
Cup holder	
Trunk (space an issue in NCO cars as they have to carry extra equipment)	
Seat Adjustment Controls	
Seatbelts	
Steering Wheel Adjustment	
Cell phone (in NCO car) that plugs into centre console and which you clip anywhere you want	
AM/FM radio	

2. List any injury or chronic condition that you have experienced that you believe to relate to your vehicle and or equipment?

Group 1 (Max of 27 dots)

Low back pain - twisting	7
Low back pain – worn out seats leading to uncomfortable posture or broken seats listing to one side	4
Low back pain (overall)	3
Low back pain – amount of gear on duty belt	2
Injury from computer mount and siren and light control (upper limb and hands – having to snake arm to reach controls or fingers getting pinched)	3
High computer mount and strain on wrist and shoulders	3
Gear getting caught on seatbelts is a nuisance	3
Plainclothes have trouble stowing all their gear, no guidelines for how to do a best 'set-up'	2

Group 2 (Max of 12 dots)

Low back pain due to length of time sitting in car	5
Low back pain due to twisting of body (though some turrets are better than others)	4
One person car (steering wheel gets in way of radio, computer, etc)	3
Pressure sores from duty belt not being ideally organized	
Amount of equipment on belt vs. waist size	
Weight of belt	
Leather belts (worse than nylon)	
Caged cars make all of above worse (as they limit seat adjustment)	
NCO Trunk not well organized, sometimes equipment like the fire extinguisher has expired	
Takes long time to get problems fixed (paper based process)	

3 List the features and types of equipment you think are most likely to contribute to injury or a chronic condition?

Group 1 (Max of 27 dots)

New computer mount (the old one wasn't great, but (among other things) the new one can potentially (?) lift out in an accident/airbag deployment	10
New lights and siren controls (this is something we have to be able to do by touch, new system doesn't allow that)	8
Size and shape of centre console – too big, too square, sharp edges and corners	6
Siren off button – no need for it and it requires you to look down(see above)	4

Group 2 (Max of 12 dots)

Laptop mount looseness (new turrets) could cause an injury in a collision or when braking	7
Car layout not optimized for single driver or NCO (VPD lays cars out for 2-drivers) Ie – controls under laptop, too many things to do while driving, etc.	4
Seat, Laptop and Mike combo – sometimes one is in the way of another when you need it	1

4 What are your key concerns regarding your health and safety with respect to the visibility in your vehicle?

Group 1 (Max of 27 dots)

Light bar behind sun visor prevents you from seeing traffic lights and gets in the way of the visors (can't push right up to mirror)	6
Visibility worse with new computer mounts (higher turret)	6
Camera mount obstructs view when doing a right hand turn	3
Computer has to be closed to see – esp. to right	2
When back trunk is open back window lights are blocked	2
Sometimes there is glare from small above mirror light bar	
Dog squad isn't impacted as they all drive trucks now	

Group 2 (Max of 12 dots)

New turrets not only reduce field of vision but also have functional problems	6
Laptop obstructs view (half of view to front and most of view to the right hand side) Laptop turret in new cars contributes to laptop obstructing view Have to close laptop lid to see the right hand mirror	4
Camera obstructs view through front window Have hit head on camera	2
Laptop adjustment knob jabs into leg	

These two following questions ended up being covered in the discussion of the other questions, so no table of results was generated.

5 What are your key concerns regarding your health and safety with respect to comfort in your vehicle?

6 What's the worst thing you've ever seen in a vehicle set up?

7 What's the worst thing you've seen with respect to vehicle set up?

Group 1 (Max of 27 dots)

Cars

Door locks – power switches have been changed so what used to typically 'locks' a door now unlocks it.	10
Air conditioning	2
Seat adjustment (the electric ones are too slow)	1
Mirror adjustments	
Seat belt adjustors and Seatbelts	
Remote trunk button	
Pedal Adjustment (dangerous, one participant has hit both pedals at same time)	

Two notes in this discussion:

- Officers typically don't get training on correct adjustment of headrest and seat belts
- Lots of the above issues are because such a wide range of people use the cars

Wagons (pre market)

Non electric mirrors	4
Seats don't adjust enough for anyone	4
Diesel fumes smell gets into cab	4
Brakes undersize for load carrying	1
Temperature control awkward to get to	

Wagons (after market)

Nowhere to secure items anywhere in cab	6
No place to put handcuffs	4
Computer mount not movable	3
There is a hook on the side near the head (no one really knows what it's for and they worry they might get jabbed by it in an accident)	2
Need winter tires **(for all cars actually)**	3
Intercom to back compartment not practical	

Group 2 (Max of 12 dots)

A/C and AM/FM radio controls hard to get to	6
Manual spotlight controls get tangled	4
Overhead shotgun mount (easy to bang head)	2
Outside spotlight control that is manipulated from inside (don't see these much anymore)	

8 What features would you like to have that you have seen other cars (in your or in other jurisdictions?

Group 1 (Max of 27 dots)

Lights on push bar on mirrors and on back bumper or on inside lid of trunk (esp. in unmarked cars)	20
Be able to have controls on steering wheel	11
Distance Sensor you can turn off (like the German police have) or rear back up camera or beeper	5
Smaller Wagon (for transport)	1

Group 2 (Max of 12 dots)

Voice activated computers (so you don't have to manually type)	4
CPIC license plate scanner as a standard feature – alerts you if it finds something	4
More interior space	4
Not having to find and handle the mike	
Scale down size of all aftermarket equipment – except laptop	
Move radio and a/c controls and move computer into resulting	

9. "Describe your dream vehicle"

Group 1 (Max of 27 dots)

Emergency Lights on Side Mirrors, Push Bars, Inside back trunk	
Brighter Headlights (Halogen?)	
Winter Tires in the winter	
Rain Shield for partially open window	
Remote door locks	
Mount siren on front push bar (will make it more audible outside and decrease inside cabin noise) (RCMP does it)	
Some kind of sound management system inside vehicle (sometimes they can't hear dispatch or dispatch can't hear them when the siren is on – apparently the dog cars have a solution…..)	

Group 2 (Max of 12 dots): What do they like about their current cars?

Like the new seats	6
Dual arm rests	6

Group 2 (Max of 12 dots): What would they like to see

Kevlar (or alternate) lined doors	8
Push Bars (welded to body)	4
Heated seats	

JIBC Recruits – Focus Group Brainstorming Summaries

1: What devices/features do you regularly use in the vehicle (egg. laptop, mike, light and siren control, spotlight)?

(Max possible 99)

Radio	37
Laptop	24
Light and Siren Control	16
Cup holder	7
Steering wheel	5
Spotlight	4
PA System	1
Back seat cage/sliding window	
Gun rack	

2. List any injury or chronic condition that you have experienced that you believe to relate to your vehicle and or equipment?

(Max possible 99)

Low back pain	45
Hips (bruising from duty belt)	36
Neck pain	25
Tingling/numb arms	8
Bruises from seat belt	5
Wrist pain (computer related)	4

3 List the features and types of equipment you think are most likely to contribute to injury or a chronic condition?

(Max possible 99)

Laptop	26
Seat design	20
Duty belt (needs padding)	20
Lumbar support	6
Radio position	5
Seat belt	3
Seat adjustment and back tilt (electric)	3
Shotgun rack	
Relation of equipment to each other	

4 What are your key concerns regarding your health and safety with respect to the visibility in your vehicle?

(Max possible 99)

Seats bottom out and you end up sitting too low	17
Blind spots in wagon (in every direction)	16
Blind spots both sides and back in cars with cage	14
Light bar behind visor	11
Back lighting of computers leads to momentary 'blindness'	8

5 What are your key concerns regarding your health and safety with respect to comfort in your vehicle?

(Max possible 99)

Position of laptop (twisting back)	44
No support for elbows/shoulder strain	11
Wrist strain	4
Equipment layout on duty belt	4
Optics vs. comfort for duty belt – would like to use a vest and/or leg holsters	9
Leg space in car	3
Would like suspenders for duty belt	5
When wearing all the gear – feel confined in cab	7

Note: About 1/3 held up hands saying their duty belt equipment layout is comfortable.

6 What's the worst thing you've ever seen in a vehicle set up?

(Max possible 99)

Mike/Radio with wires	19
Lights and siren control position	17
Radio Mount only on passenger side	17
Laptop mount position	16
Cup holders behind MDT	11
Radio cord wraps around computer	4

7 What's the best thing you've seen with respect to vehicle set up (or what have you seen elsewhere that you'd like to have)?

(Max possible 99)

Hands free radio	29
Back support/seat that moulds around duty belt and/or Seats cut out for duty belt or bolster t build up around duty belt	16
Light and siren control on the steering wheel	12
Heads up display	11
In dash GPS with better interface	10
'Bullet proof'/re-enforced door panels	4
Better storage for loose stuff in car	3
Heated seats	1
Radio attached to laptop	1
Telescoping brakes and gas pedals	
Infra red cameras	

9. "Describe your dream vehicle"

(Max possible 99)

Swivel chair or MDT that could be moved to be right in front of you	37
SUV	24
4 wheel drive/All wheel drive	14
Side Airbags	7
Black and white cars	7
CD player/MP3 jack	4

Appendix Four:

Police Act

POLICE (UNIFORMS) REGULATIONS

From the BC Laws website:

www.bclaws.ca/Recon/document/freeside/--%20p%20--/police%20act%20%20rsbc%201996%20%20c.%20367/05_regulations/19_564_76.xml

IMPORTANT INFORMATION
October 25, 1976
B.C. Reg. 564/76
O.C. 3135/76Filed

Police Act
Police (Uniforms) Regulations

[includes amendments up to B.C. Reg. 170/2006, June 14, 2006]

Contents

Interpretation

1 In these regulations:

"executive officer" means chief constable and deputy chief constable;

"senior officer" means all commissioned ranks other than an executive officer;

"officer" means all other ranks;

"uniform" means the basic working uniform worn during a normal tour of duty, but

does not include an administrative, formal or dress uniform;

"medium blue" means a shade of blue similar to the blue quoted in the Dominion Textile folder - ” "rogue cloth #C1754".

Application of regulations

2 (1) These regulations apply only to municipal forces established under section 26 of the Police Act, and take effect on October 1, 1976.

(2) These regulations do not apply to uniforms and accessories on order on that day, or in stock or in use on or before that day, but full compliance is required by October 1, 1979.

Basic uniform

3 (1) The uniform for executive officers (male) shall be as follows:

(a) cloth -dark navy blue;

(b) jacket design -Eisenhower style, single breasted front closing, 2 patch type breast pockets, shoulder straps, gold buttons;

(c) trouser design -western style slack design, 2 front pockets, 2 rear pockets, special pockets as required, medium blue stripe 3/4 inch wide from waist to cuff.

(2) The uniform for senior officers (male) shall be as follows:

(a) cloth -dark navy blue;

(b) jacket design -Eisenhower style, single breasted front closing, 2 patch type breast pockets, shoulder straps, silver buttons;

(c) trouser design -western style slack design, 2 front pockets, 2 rear pockets, special pockets as required, medium blue stripe 3/4 inch wide from waist to cuff.

(3) The uniform for officers (male) shall be as follows:

(a) cloth -dark navy blue;

(b) jacket design -Eisenhower style, single breasted front closing, 2 patch type breast pockets, shoulder straps, silver buttons;

(c) trouser design -western style slack design, 2 front pockets, 2 rear pockets, special pockets as required, medium blue stripe 3/4 inch wide from waist to cuff.

(4) The uniform for all ranks (female) shall be as follows:

(a) cloth -dark navy blue;

(b) jacket design -Eisenhower style, single breasted front closing, 2 patch type pockets, shoulder straps, silver or gold buttons appropriate to rank;

(c) slack design -western style slack design, pockets as required, medium blue stripe 3/4 inch wide from waist to cuff;

(d) culottes and (or) skirt design -"A" line style, knee length, one slash pocket in each side seam.

(5) Shirts or blouses for all ranks shall be medium or navy blue with shoulder straps of contrasting dark navy blue, 2 breast flap pockets with suitable buttons or snap fasteners.

(6) All ranks shall wear dark navy blue clip on ties.

(b) A person of any rank may remove a tie when he is

(i) wearing a short sleeved shirt or blouse, as the case may be, and

(ii) not wearing a uniform jacket, patrol jacket or windbreaker.

(7) All ranks (male) shall wear navy blue or black socks.

(b) All ranks (female) shall wear a neutral or navy blue shade of hosiery.

(8) All ranks shall wear black oxfords or boots as directed by the chief constable.

(9) Handbags, when carried by female ranks, shall be plain black leather with shoulder length strap.

(10) All leather accessories shall be black, of good quality, with the following description:

(a) equipment belt -plain finish, 2 1/4 inch wide, fully lined, silver fasteners;

(b) holster -plain finish, worn strong side at waist level;

(c) handcuff pouch -plain finish, attached to equipment belt;

(d) ammunition pouch -plain finish, closed style, attached to equipment belt.

(11) A member (male) of any rank who is a baptized practising member of the Sikh religion may:

(a) wear under the prescribed uniform a replica of the kirpan;

(b) wear on the wrist a kara (steel bracelet) with a maximum width of 5 mm;

(c) wear under the turban a khanga (comb);

(c) keep the hair and beard uncut provided that it is kept neat with the hair tied in a bun and concealed under the issued turban.

[am. B.C. Regs. 20/80, s. 1; 346/93, s. 1; 315/97, s. (a).]

Outer wear

4 (1) Overcoats for all ranks shall be as follows:

(a) cloth -dark navy blue;

(b) design -military style.

(2) Windbreaker/parka for all ranks shall be as follows:

(a) cloth -dark navy blue;

(b) design -

(i) windbreaker -front closure, single breasted, hip length, waterproof shell, 2 patch breast pockets, 2 inside lower pockets, shoulder straps, silver or gold buttons appropriate to rank, side vents to allow access to equipment;

(ii) parka -front closure, single breasted, finger tip or longer in length, waterproof shell, 2 patch breast pockets, 2 patch lower pockets, 2 inside breast pockets, storm cuffs, waist draw cord, convertible collar with detachable hood.

(3) Rainwear for all ranks shall be as follows:

(a) cloth -dark navy blue, with reversible side of safety orange when issued to members on field assignment, but black may be worn by non-operational members;

(b) design -full length, raglan sleeve, nylon, snap front, 2 side slash pockets.

(4) Patrol jacket for all ranks shall be as follows:

(a) cloth -nylon, dark navy blue;
(b) design -Eisenhower style, single breasted front closing, 2 patch type breast pockets, shoulder straps, silver or gold buttons appropriate to rank.

[am. B.C. Reg. 20/80, s. 2.]

Headgear

5 (1) The headgear of all ranks shall be as follows:

(a) cloth -dark navy blue, with black band;

(b) design -

(i) executive -officer's cap, black peak with gold bar embroidery, gold buttons, black strap, municipal cap badge in gold;

(ii) senior -officer's cap, black peak with silver bar embroidery, silver

(iii) officer -office's cap, black peak, black buttons, black strap, municipal cap badge;

(iv) any rank (male) of a baptized practising member of the Sikh religion -in place of other headgear described in this paragraph, a turban of the colour specified in paragraph (a), with a municipal cap badge centred on its front.

(2) Repealed. [B.C. Reg. 102/89.]

(3) The headgear for all ranks while riding a motorcycle shall be a safety helmet approved by the Canadian Standards Association and shall be white with navy blue trim.

[am. B.C. Regs. 102/89; 346/93, s. 2.]

Special uniforms

6 Special uniforms, i.e. motorcycle operators, dog handlers, mounted squad, bicycle squad, emergency response team, marine division, shall be as follows:

(a) cloth -dark navy blue, with contrasting stripe of medium blue where practical;

(b) design -functional in relation to assignment and subject to the approval of the commission.

[am. B.C. Reg. 315/97, s. (b).]

Insignia

7 (1) The following ranks shall wear on their shoulder straps the insignia described as follows:

(a) chief constable -a single crown above 3 pips, in gold;

(b) deputy chief constable -a single crown above 2 pips, in gold;

(b) superintendent -a single crown above a single pip, in silver;

(d) staff inspector -a single crown, in silver;

(e) inspector -3 pips, in silver.

(2) The following ranks shall wear on the upper part of each sleeve the following cloth insignia:

(a) staff sergeant -3 chevrons and a crown;

(b) sergeant -3 chevrons;

(c) corporal -2 chevrons.

All chevrons will be silver on black.

(3) The following ranks shall wear, on their jacket lapels, badges depicting the municipal crest or maple leaf; gold for executive officers and silver for other ranks:

(a) chief constable;

(b) deputy chief constable;

(c) superintendent;

(d) staff inspector;

(e) inspector;

(f) staff sergeant;

(g) sergeant;

(h) corporal.

(4) Cloth shoulder flashes identifying the municipal force shall be worn on all garments except rainwear; gold for executive officers and silver for all other ranks.

(5) Design and placement of special badges awarded for special reasons such as dog handler, marksman, etc., shall be subject to the approval of the commission.

(6) (a) Service badges awarded on the basis of one for each 5 years of service shall be a cloth, 5 pointed star, silver, not larger than 3/4 inch in size, worn on the lower sleeve of the left arm.

(c) A long service ribbon and bar may be worn in place of service badges.

[am. B.C. Reg. 404/87, s. 1.]

Identification

8 (1) A badge, metal, plastic or cloth, bearing an identification number or name, shall be worn above the right breast pocket of all uniform officers, but the wearing of an identification badge by executive and senior officers shall be at the discretion of the chief constable.

(2) Pocket badges depicting the municipal crest and suitably marked "POLICE"
shall be issued by each municipality.

(3) An identification card, wallet size, white with dark blue printing, shall be issued to each member and

(a) the front side shall

(i) clearly identify the municipality (municipal crest optional), the name of the police department, and the full name and present rank of the holder, and shall bear a photograph of the holder, black and white or colour, in the top right corner and the signature of the chief constable in the bottom right side,

and

(ii) in the case of an executive or senior officer, bear the signature of the chairman of the board instead of the chief constable, and

(b) the reverse side shall clearly state the date of birth, height, weight, colour of hair, colour of eyes and blood group of the holder and shall bear his signature and, under his signature, the following sall appear:
The person identified herein is a Peace Officer appointed under the authority of section 26 of the Police Act.

[am. B.C. Regs. 601/77; 20/80, s. 3; 404/87, s. 2; 170/2006.]

Miscellaneous

9 Styles and character of administrative, formal or dress uniforms are at the discretion of the chief constable and are subject to the approval of the commission.

Previous regulations repealed

10 These regulations apply to municipal forces as established under section 26 of the Police Act and supersede all previous regulations governing those municipal forces in matters covered by these regulations, and all such regulations are repealed.

[Provisions of the Police Act, R.S.B.C. 1996, c. 367, relevant to the enactment of this regulation: section 74 (2) (g)]