

SAFETY AND HEALTH INVESTMENT PROJECTS FINAL REPORT

Protecting the Badge:
Decreasing Musculoskeletal Problems in Law Enforcement Officers
Through Workplace Ergonomics
SHIP Grant #2011WC00190
March 28, 2012 – October 1, 2013

by
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Washington State Department of
Labor & Industries
Division of Occupational Safety and Health

PART I

Narrative Report

Organization Profile:

For awarded organizations, to include partners and collaborators, provide a brief description of each organization. Mission, vision, and purpose for each of the organizations who applied (this includes partners and collaborators) for the grant.

The mission of the City of Pullman Police Department is to provide public safety services by developing and maintaining a strong partnership with our community to enhance the quality of life for all persons. In 2011, Business Week declared Pullman the “Best Place to Raise Kids in Washington”, an accolade that speaks to the department’s commitment to achieving this mission. Quality of life issues and community-oriented policing are the cornerstones of the department. Pullman Police Department is comprised of a group of tight-knit, family-oriented, and long-term employees. Turnover among the ranks is rare among the 28 commissioned officer positions.

Employing long-term, career police officers benefits the both the department and the community. However, in the last decade, two officers have left the department due to disabling back injuries and four additional officers have undergone various back surgeries. While police work is inherently dangerous, the cumulative effects of duty belts, in conjunction with sitting in office chairs and patrol cars, can potentially be more devastating to an officer’s health in the long run.

This project attempted to address some of the ergonomic issues surrounding long-term back strain in law enforcement, which would aid us in the departmental goal of keeping employees on the road and able to serve the community they live in.

Abstract:

Present a short overview of the nature and scope of the project and major findings (less than half a page).

The original project design was comprised of three phases:

1. Initial test-fit assessment of multiple duty belt systems
2. Purchase, deploy, and assess impact of new duty belt system
3. Purchase, deploy, and assess impact of new office chairs and patrol vehicle seats

During grant implementation, the original project plan went through several modifications. Based on feedback from S.H.I.P. grant consultants, additional phases and control groups were added to attempt to determine which equipment was causing which result. The most significant change to the original project plan was that a new duty belt system was not implemented in the department. None of the duty belt systems fit-tested during Phase I out-performed the duty belts currently in use by the department, and some had serious deficiencies and/or office safety concerns (results of duty belt fit-testing will be included below). Ultimately, the project was restructured to determine the impact of different seating options, both in the office chairs and vehicle seats, had on the musculoskeletal health of the police officer.

While there were some problems in plan design, the data still indicated an overall reduction in the overall Pain Profile of the officers of 23.109%. Officer feedback indicated higher levels of satisfaction with the office chair replacement than with the changed patrol vehicle seat.

Purpose of Project:

Describe what the project was intended to accomplish.

To reduce musculoskeletal pain and discomfort by at least 25% in law enforcement officers by practical application of workplace ergonomics in three areas: officer equipment (duty belt), the office, and the patrol car.

Statement and Evidence of the Results:

Provide a clear statement of the results of the project include major findings and outcomes and provide evidence of how well the results met or fulfilled the intended objectives of the project.

Problem Statement

Police work is dangerous. Whether driving in a high-speed pursuit, chasing a robbery suspect over uneven terrain, or grappling with an armed assailant, the occupation and environmental hazards faced by law enforcement personnel on a daily basis constitute severe risks to their personal health and welfare. According to the U.S. Department of Labor 2009 report, *Nonfatal Occupational Injuries and Illnesses Requiring Days Away From Work*, law enforcement personnel at the state government level had an incident rate of days-away-from-work (DAFWs) 3.15 times higher than the total incident rate for all state government workers. At the local government level, the discrepancy was even higher, with the incident rate of DAFWs for law enforcement personnel being 3.65 percent higher than the incident rate for all local government workers. Additionally, law enforcement officers at

the local government level had the highest number of cases of reported DAFWs of any job category, with 31,300 in 2009, an increase of 30 percent from 2008 (DOL, 2010).

Many of the job hazards that contribute to these high numbers are an inherent, unavoidable part of a law enforcement officer's commissioned duty to serve and protect the citizens of their jurisdiction. However, some occupational hazards faced by law enforcement personnel are controllable in scope. Specifically, ergonomic inadequacies of officer uniforms, work stations, and patrol cars can contribute to a myriad of preventable musculoskeletal disorders, most commonly in the form of lower back pain. According to the U.S. Department of Labor, musculoskeletal disorders accounted for 28 percent of all workplace injuries and illnesses requiring time away from work in 2009 (DOL, 2010). Previous studies performed in 1998 had identified that 62 percent of police officers suffer from low back pain, with only 8 percent having had back pain before joining the force (Shea & Poliquin, 2011). However, a recent study published by The Journal of Criminal Justice Research (JCJR) reported that 86 percent of the participating law enforcement officers reported having lower back problems, ranging from occasional back pain (55%) to experiencing it often (25%) or daily (10%) (Anderson, et al, 2011). And while 77 percent of participants in the JCJR study reported that their sick leave related directly to their lower back pain was no greater than five working days in the past year, 63 percent of those officers also indicated that additional sick leave was warranted, and in retrospect, think they should have used more sick time to expedite their recovery (Anderson, et al, 2011).

The City of Pullman Police Department has experienced first-hand the detrimental effects of employees suffering from lower back injuries. In the last decade, two officers have left the department due to disabling back injuries, and four additional officers have undergone various back surgeries. While their normal police work is inherently dangerous, it is widely believed in our department that the cumulative effects of duty belts, inadequate office seating and patrol vehicle seating cars can be more devastating to an officer's health in the long run.

While there is substantial research that points to a correlation between working in law enforcement and musculoskeletal problems, determining the direct causation of the problem has proven difficult. Due to the nature and duties of the job, researchers are unable to simply exclude variables in order to test which risk factors significantly contribute to the development of lower back pain in law enforcement officers. Instead, researchers are forced to rely on self-assessments and general ergonomic science to identify controllable risk factors which contribute to officer musculoskeletal disorders.

Project Plan

Initially, the proposed project plan was broken into three phases:

- Phase I – Office Chair & Patrol Vehicle Seating Procurement & Assessment
- Phase II – Multiple Duty Belt Pre-Testing & Evaluation
- Phase III – Duty Belt Procurement & Assessment

This plan design was proposed with the idea that a new baseline would be established following the assessment of the new seating options, and then the impact of the duty belts

could be assessed on top of those changes.

Based on initial feedback from S.H.I.P. grant consultants, the project plan was revised to the following:

- Phase I – Initial Equipment Pre-Evaluation & Procurement
- Phase II – Duty Belt Deployment & Assessment
- Phase III – Office Chair & Patrol Vehicle Seating Deployment & Assessment

As the project plan was implemented, the plan would go through additional modifications, as described below.

Phase I – Initial Equipment Pre-Evaluation (Duty Belts) & Procurement

During Phase I, the following equipment was ordered from vendors:

- Seven (7) replacement driver seats for Ford Crown Victoria patrol vehicles
Cynergy Products, Michigan: distributor for Global Interior Solutions
- Sixteen (16) new office chairs, including one with an extra-long seat pan
Keeney's Office Supply, Redmond, WA: U.S. distributor for ergoCentric Seating Systems
- Twelve (12) rigid seat belt extenders
More of Me to Love, LLC: distributor for Seat Belt Extenders Pro

Additionally, various duty belt/suspension system vendors were contacted to participate in the initial screening/test-fitting evaluation period to determine which system would purchase for unilateral distribution and use for the remainder of the project. The vendors and products that were ultimately evaluated were:

- Back Defender Suspender System (hidden duty belt suspension system)
Back Defense Systems – Fort Worth, TX: www.backdefensesystems.com
- Professional Comfort System duty belt
Tactical Design Labs, Inc – Eagle, ID: www.tdlabs.com
- Duckbill Duty Gear Belt (Max-Con platform and docking technology duty belt)
Duckbill Enterprises, Inc – Quebec, Canada: www.duckbilllaw.com
- DutySmith SpeedSet System duty belt
DutySmith – Seattle, WA: www.dutysmith.com

Before initiating the wear-fit evaluation process, all potential systems underwent a pre-screening evaluation performed by Pullman Police Department four specialty assignment personnel to determine whether, based on their training and experience, they were safe for officers to wear in the course of duty. These four members were:

- Sergeant – Defensive Tactics Instructor
- Senior Police Officer – Lead Firearms Instructor
- Senior Police Officer – Firearms Instructor / S.W.A.T. member
- Senior Police Officer – Defensive Tactics Instructor

During the pre-screening, these members were asked to evaluate the equipment based upon six safety concerns, including unsafe weapon position/presentation/orientation; restriction of range of motion; product material/construction; snagging hazards; securing /anchoring mechanisms; and whether a suspect would be able to use the equipment against the officer. After considering these six factors, the members were asked to make a

final recommendation as to whether or not the equipment was approved for use by Pullman Police Department personnel.

As a result of this process, the *Duckbill Duty Gear Belt* was eliminated from the project due to concerns about equipment construction and issues with holster and magazine design. The three remaining duty belt/suspension systems were moved forward into the wear-fit testing process, in which eight Pullman Police Department officers had volunteered to wear the equipment for four weeks and evaluate it.

Very quickly, the *Back Defense Back Defender Suspender System* was removed from the wear-fit test due to the fact that the majority of Pullman Police Department officers wear jumpsuit-style uniforms, rather than the two piece shirt and pants-style uniform worn by many agencies. Attempts to modify the uniform to accommodate the *Back Defender Suspender System* were unsuccessful, and including attempts to wear outside of the jumpsuits, which were discouraged by the department's defensive tactic instructors.

The eight officers evaluated the final two remaining systems over the course of the next eight weeks. Four officers would wear each one of the systems for four weeks, and then they would evaluate the systems' performance before testing the other system. There were major problems with the *DutySmith SpeedSet System*; several of the plastic equipment "carriers" broke or would not lock into the rail system correctly. Even after receiving additional *DutySmith* equipment from a different manufacturing lot, problems persisted. At the end of the eight week wear-testing period, each duty belt had two officers who liked the equipment. However, by averaging the evaluation responses (represented in the in Chart 1 & 2 below), it was clear that in the short testing period, neither *Tactical Design Labs Professional Comfort System* nor the *DutySmith SpeedSet System* really performed any better than the standard duty belts they were currently issued by the department.

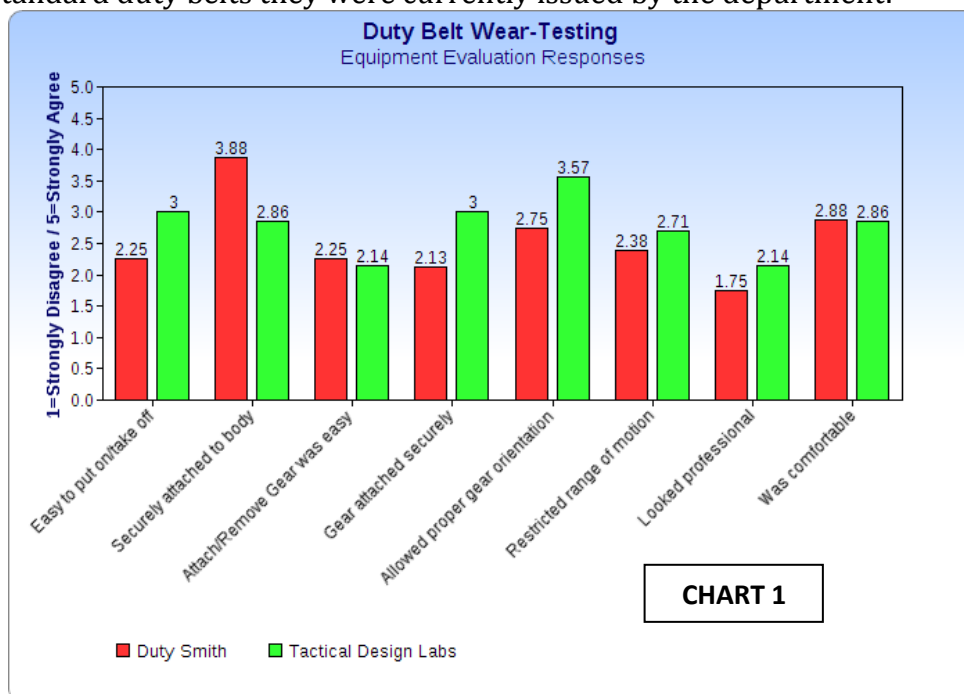


CHART 2

Equipment Evaluation Questions	Duty Smith		Tactical Design Labs	
	YES	NO	YES	NO
Did duty belt CAUSE pain?	2	6	2	5
Did duty belt ALLEVIATE pain?	0	8	1	6
Would you choose this duty belt over your current one?	0	8	1	6

Since none of the duty belt/suspension systems performed exceptionally well in the wear-test process, the Pullman Police Department ultimately decided it would not purchase any new duty belt systems with grant funds. Instead, the project plan was modified to focus on the impacts of changes to office and vehicle seating on officer musculoskeletal disorders.

Phase II – Evaluation Period #1 – Office Chairs & Patrol Vehicle Seating

By this point, three of the seven vehicle replacement driver seats had been installed into patrol vehicles and half of the office chairs had been assembled. All sworn Pullman Police officers were divided into three groups: Groups A, B, and C (the control group). During Evaluation Period #1, which ran from February 1-April 15, 2013:

- **Group A** personnel were assigned to drive the patrol vehicles with the new seats, but continue using the **old** office chairs.
- **Group B** personnel were assigned use the new office chairs, but to continue driving the patrol vehicles with the **old** seats.
- **Group C** personnel were assigned to continue to use the **old** office chairs and drive the patrol vehicles with the **old** seats.

At the conclusion of the evaluation period, officers completed a health assessment and equipment assessment forms.

An additional note during this period was that the project plan originally called for the use of rigid seat belt extenders. The theory was that the extenders would allow the officer ease of exiting the vehicle, prevent unnecessary turning/pivoting in the seat, as well reduce the amount of pressure/disorientation placed on the weapon worn on the officer's right hip. The extenders were purchased and installed in the same three vehicles containing the new replacement seats. However, within hours, the first one broke. After having swapping out a couple different extenders from the total ordered, making multiple phone calls with the vendor, trying out more traditional "floppy" extenders, and having one officer unable to unbuckle the extender when attempting to exist his vehicle, we quickly removed the seat belt extenders from the project as well and returned them to the vendor. *See "Uses" section at the end of this report for more information on the faulty seat belt extenders.*

Phase III - Evaluation Period #2 – Office Chairs & Patrol Vehicle Seating

During Evaluation Period #2, which ran from April 22-June 30, 2013, Groups A & B essentially swapped equipment assignments:

- **Group A** personnel were assigned use the new office chairs, but to return to driving the patrol vehicles with the **old** seats.

- **Group B** personnel were assigned to drive the patrol vehicles with the **new** seats, but return to using the **old** office chairs.
- **Group C** personnel were assigned to continue to use the **old** office chairs and drive the patrol vehicles with the **old** seats.

At the conclusion of the evaluation period, officers completed their final health assessment and equipment assessment forms. Additionally, officers were asked to complete a five-question, short answer overall assessment of all of the equipment and the project in general.

Phase IV – Final Evaluation and Implementation

At the conclusion of Evaluation Period #2, officer assessment results were compiled and reviewed. With the exception of a couple of officers, the feedback regarding the *ergoForce* office chairs was overwhelming positive. The decision was made to purchase one additional extra-long seat pan, assemble the remaining half of the chairs that had been held in storage during the evaluation period, and deploy the *ergoForce* office chair department-wide. Employees who had expressed a dislike for the new chairs were given two weeks to choose and mark the old chair they wanted to keep; after that time, the remaining old chairs were disposed of.

Implementation of the vehicle patrol seats was a different matter. Assessment data was more mixed on the *Cynergy Products* replacement Ford Crown Victoria seats, and two officers could not use the vehicles with the new seats in them due to the higher seat profile forcing their heads into the vehicle ceiling. Also complicating the situation, after the grant had been awarded, Ford Motor Company announced that it would discontinue production of the Crown Victoria model vehicle. Like other departments across the nation, the Pullman Police Department was forced to decide on a new vehicle make and model to integrate into its vehicle fleet. Due to these two factors, the decision was made to **not** implement installation of the *Cynergy Products* replacement seats into the department's remaining Crown Victoria vehicles. Per instructions from the S.H.I.P. grant manager, the Pullman Police Department will continue to hold the remaining four vehicle seats for donation to any interested government agency which may have a need to replace aging vehicle seats.

Final analysis of the project assessment data also revealed a flaw in the project design; namely, that one would not be able to determine if changes in pain profile data between Evaluation Period #1 and #2 was the result of the equipment assigned for use during Evaluation Period #2 or the whether it was result of the removal of the equipment used during Evaluation Period #1. Conversations with consultants from L&I concluded in retrospect that a different project design removing the flip-flopping of equipment might have shown clearer direct correlation results to specific equipment items. Longer evaluation periods overall were also discussed.

Project Results – Pain Profile

Assessments of the officer's perception of discomfort were made with two instruments, a questionnaire "Pain Profile" of eight distinct areas of the body and a more detailed "Symptom Survey" of 12 sites on both sides of the body (total of 24). The symptom survey

was applied to be able to provide more detail against the Pain Profile. Assessments were done at three points in time October 2012, April 2013, and July 2013. Table 1 expresses the aggregate raw score and The overall pain of those sampled dropped one full point on a 10 point scale. Chart 3 represents average of all officers for the Pain Profile. Officers' perception of pain or discomfort declined in all areas except the mid back. Lower Back pain dropped from the moderate pain category to the mild pain category.

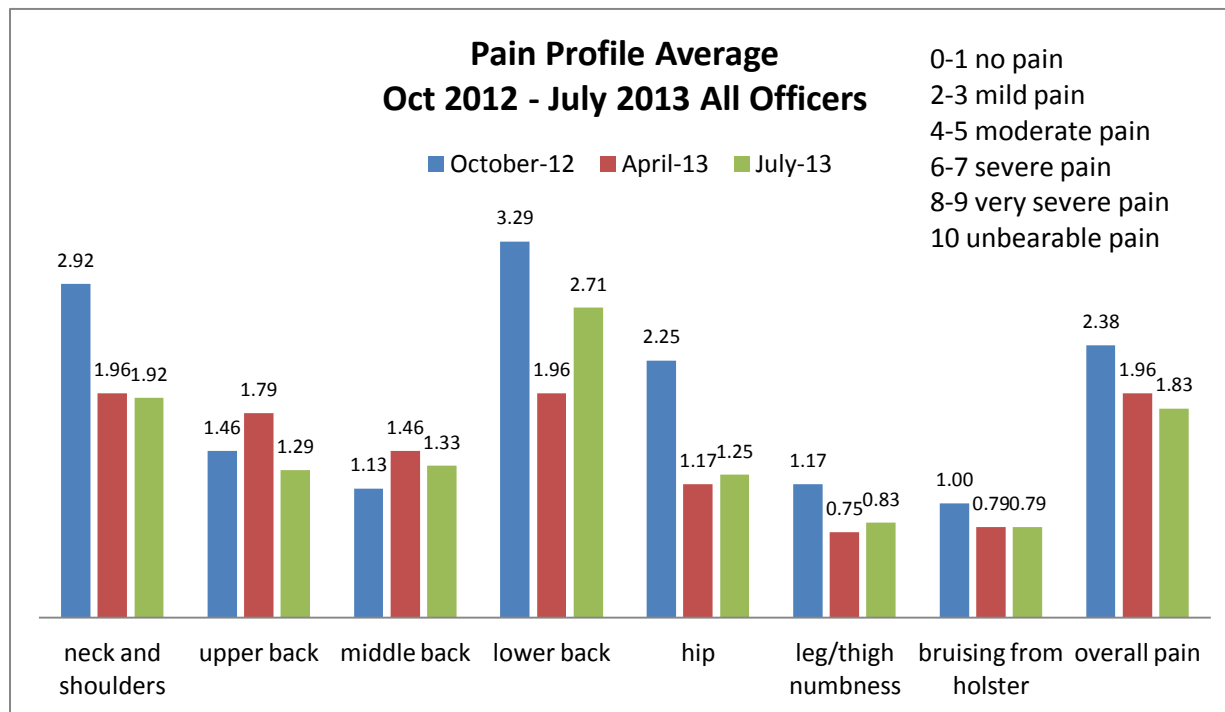


Chart 3

New Equipment

The grant objectives included an assessment of new vehicle seating and office chairs to see if they played a role in reducing discomfort among the officers. The results are shown in Charts 4, 5, 6, and 7.

Office Chairs (Charts 4 and 5)

The new office chairs were very popular with the officers. Some mentioned they liked the ability to swing back the arms. It seems like they are an appropriate replacement for the variety of existing chairs. Some may wish to keep their existing chair.

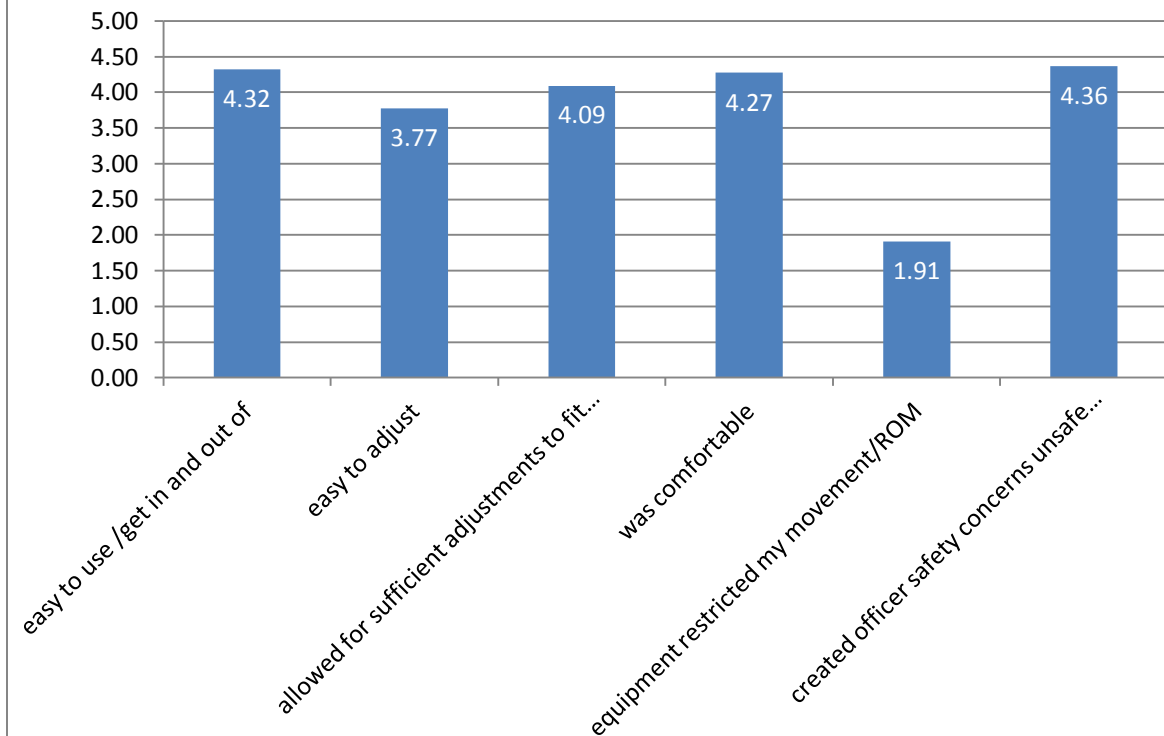


Chart 4

1 strongly disagree 2 somewhat disagree 3 neutral 4 somewhat agree 5 strongly agree

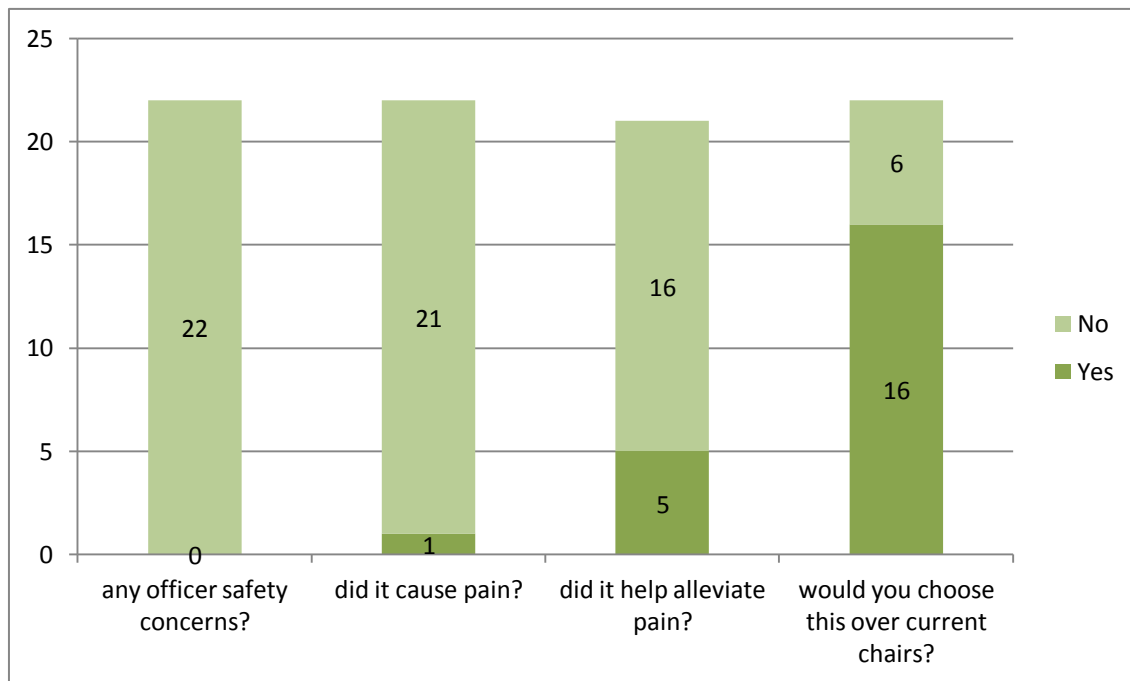


Chart 5

Vehicle Seats (Charts 6 and 7)

The vehicle seats did not elicit a strong reaction on either side of the preference spectrum. Most scores were in the neutral range. One officer indicated that the seat profile was higher, which affected their headroom.

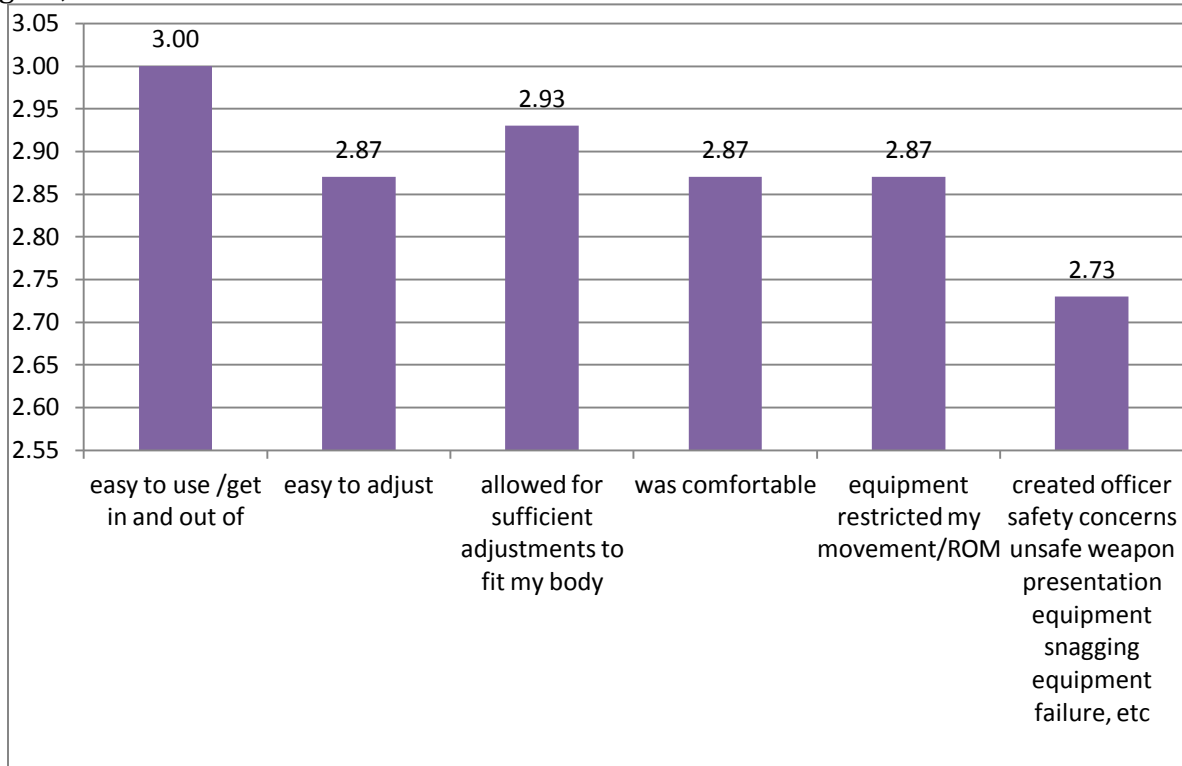


Chart 6

1 strongly disagree 2 somewhat disagree 3 neutral 4 somewhat agree 5 strongly agree

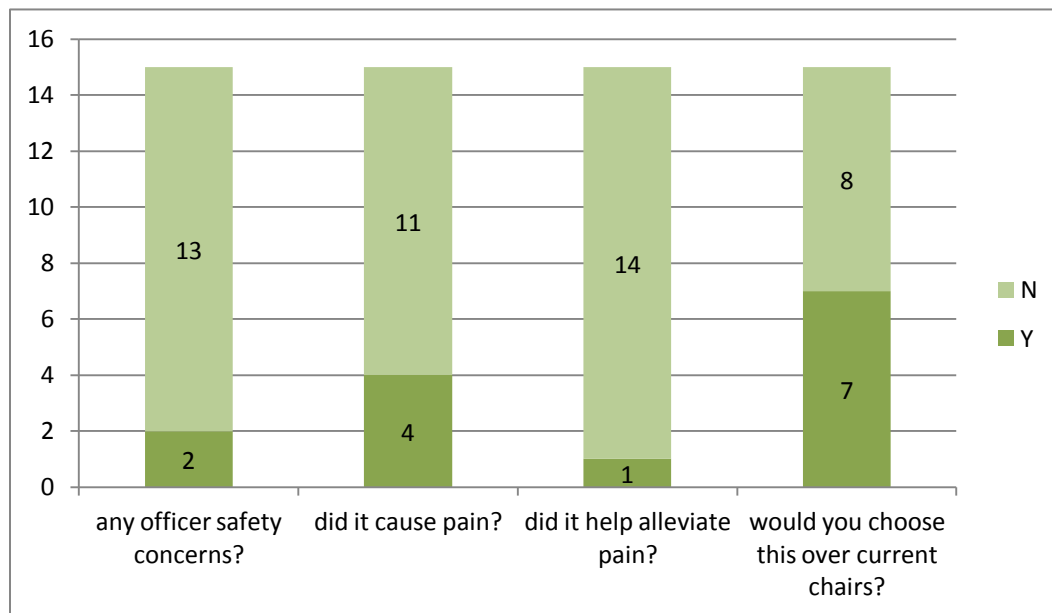


Chart 7

Conclusion

Through this project, the Pullman Police Department sought to decrease musculoskeletal problems in law enforcement officers through application of workplace ergonomic practices. While the project plan went through various modifications due to officer safety concerns, equipment failures, and changes to vehicle fleets, ultimately the project still produced results of note for other law enforcement agencies. Most significantly, as a result of project implementation, the officer **Pain Profile** showed a one point reduction in overall discomfort on a ten scale, and an overall reduction of officer discomfort of 23.109%. Anecdotal evidence indicates that this reduction was primarily the result of the implementation of the new office chairs.

Pullman Police Department's *Protecting the Badge* project also provided good information on the shortcomings of equipment options currently available to law enforcement officers, and highlights the need for further research, development, and investment in this area. At the end of the day, law enforcement is still a dangerous profession which poses many hazards to an individual officer's health. However, a 23.109% reduction in officer discomfort by simply providing upgraded office chairs proves that seemingly small changes can make a significant impact. It is incumbent upon local, state, and national agencies to determine what other improvements can be made to ensure that we are creating a healthy working environment for our law enforcement officers, thereby enabling them to more effectively perform their vital service to our communities.

Measures to Judge Success:

If relevant, state what measures or procedures were taken to judge whether/ how well the objectives were met and whether the project or some other qualified outside specialist conducted an evaluation.

Officers completed health assessment and equipment questionnaires at regular intervals throughout the project to collect data on changes to their personal Pain Profile as well as their perceptions of the new equipment and its impact on their health.

The data from assessments was compiled into a matrix. Averages and means were identified, and the data was submitted to Bruce Coulter, L&I Ergonomics Specialist, for review and analysis. See his comments in the “Feedback” section below.

Relevant Processes and Lessons Learned:

Specify all relevant processes, impact or other evaluation information which would be useful to others seeking to replicate, implement, or build on previous work

AND

Provide information on lessons learned through the implementation of your project. Include both positive and negative lessons. This may be helpful to other organizations interested in implementing a similar project.

Relevant Processes:

1. As mentioned earlier in this report, a final project analysis revealed a flaw in the project design as finally implemented. By having officers switch from testing one piece of equipment to the other, it became unclear whether the data received for the second evaluation period was the result of the **new** equipment assigned for use during that period or the result of the **removal** of the **new** equipment used during the first evaluation period. Future projects evaluating the impacts of multiple equipment implementation should either go for longer, parallel evaluation periods or consider a evaluating through a compounding effect (Equipment A *plus* Equipment B).

Lessons Learned:

1. It is extremely important to gain and maintain employee “buy-in” on an equipment assessment grant. While there was initial support for the grant, we learned at the end of the project that some employees grew frustrated with the grant process, specifically the paperwork (health assessments, questionnaires, and surveys). Clear communication at the onset of the overall process, combined with consistent communication throughout the project of both *what* needs to be done and *why* it needs to be done, could have reduced employee frustration with the process.
2. Pre-testing of equipment is vital prior to unilateral deployment. While some potentially serious problems were avoided by our proactive pre-screening of the duty belt suspension systems, similar pre-testing could also have been applied to other project equipment, like the seat belt extenders, to identify many of the problems encountered prior to the equipment being used by an active, on-duty police officer.

Product Dissemination:

Outline of how the products of the project have been shared or made transferrable.

The Pullman Police Department, in collaboration with Dr. David Makin of Washington State University, is in the process of submitting an article for publication in both a law enforcement publication as well as an international ergonomic health journal.

Completed articles will be published on our department website, as well sent to Department of Labor & Industries S.H.I.P. program, as well as WASPC (Washington Association of Sheriffs and Police Chiefs) for dissemination to interested parties.

Feedback:

Provide feedback from relevant professionals, stakeholder groups, participants, and/or independent evaluator on the project.

Selected feedback from Pullman Police Department officers:**1. Impressions of ergoForce office chairs:**

- They were more comfortable than regular chairs because they provided more back support.
- They are much better than the old chairs. I like the adjustable arm rests.
- I found no big difference in the chairs, although I did like that I could move the arms down and out of the way.
- They are much better than the previous chairs. My only complaint is the arms need to be more stable. The lumbar support has improved sitting at my desk.
- Huge improvement – new chairs were very comfortable. Better padding, many ways to adjust them and provide support to a wide range of body types. Folding arms were a great feature.
- I don't notice any difference between the new and old chairs. To me, a chair is a chair.
- I liked the chairs. It felt better on my back and I liked the adjustability. I specifically liked the ability to move the arm rests.
- The only negative is the vinyl on the back unsnaps my back keepers.

2. Impressions of Global Interior Solutions vehicle seat (Ford Crown Victoria):

- The seats just seemed wider and fatter than other seats so there was no noticeable difference.
- I like the seat covers in the Crown Vics – they are more supportive for back + legs.
- These seats were very uncomfortable and provided little support.
- I would have liked to try seats with cut outs where my duty belt sat. These just seemed like new seats – same style.
- These seats were very uncomfortable and provided little support.
- Terrible – wasn't able to test them because the decreased head-room to the point that I could not safely operate the vehicle.

3. Impressions of seat belt extenders (which broke & were removed from project):

- I liked the concept. I wish they worked.
- I liked the nylon [rigid] seat belt extenders. It was nice not having to reach across my duty belt to buckle.
- The seatbelt extenders were a good idea and made putting on the seatbelt easier.

Too bad they were crap.

- I think they caused more problems.
- Having the seatbelt received at a higher point was a great idea. It would help officers from having to slide to one side to attach the seatbelt.
- An **Emergency Vehicle Operator Course (EVOC) Instructor** expressed serious concerns that, during a collision, the displacement of the seat belt buckle could press into soft vital organs, instead of being out of the way by being low and to the side.

4. Impressions of the project overall:

- I think it is impossible to find one product that will accommodate all the different body types. This grant forced me to try a [duty] belt that was detrimental to my health.
- Without knowing more costs/benefits of the grant, the idea of health benefits in such a short time frame was unknown – was more of a “do you like it” time frame.
- Too much paperwork. I didn’t know how to answer a lot of the body injury questions because it was too specific.
- I felt there was ample opportunity for input.
- There were too many assessment forms and more paperwork than it was worth.

5. Discuss ergonomics, police officer health & safety, & where more research is needed:

- I think officers should have more say in how cars are set up to help ergonomics.
- A more comfortable [ballistic] vest.
- I think it’s just part of the job having to carry and wear so much gear.
- Women’s health and ergonomics.
- It is a shame that the one possibly best solution ([tactical gear-carrying] vests) was discounted from the testing. It’s sort of like exploring how to decrease travel time but saying we will not consider air travel.

Feedback from Bruce Coulter, L&I Ergonomic Specialist:

In conclusion, the effort that Pullman PD put into the project was impressive and they worked within the prescribed study design (L&I’s), which upon reflection may have confounded some of the discomfort data. The duty belts proved early to not be worthy of trial due to safety issues when confronting combative “customers” by providing additional points with which to grab hold. The rigid seatbelt extenders were preferred, but they seemed to break, and to some provide a possible deterrent to egress.

The results of the **Pain Profile** showed a one point reduction in overall discomfort on a ten scale which may be attributable more to the office chairs than the vehicle seating.

However, in terms of the outcome I would say they got good information about equipment with which to help the officers better and more comfortably do their jobs.

In terms of their stated goal of reducing officer discomfort by 25%, the results of the **Pain Profile** show a reduction of 23.109%, which is darn close. Good work!

Project's Promotion of Prevention:

Explain how the results or outcomes of this project promote the prevention of workplace injuries, illnesses, and fatalities?

The project demonstrated a clear short-term decrease in the officer **Pain Profile**, primarily as a result of the new office chairs. The project highlights the importance of maintaining proper office ergonomics, even in non-traditional office settings. The project also highlights that in this era of tight budget constraints, properly maintaining and upgrading equipment is not simply a matter of aesthetics, but as direct impacts on health and safety of personnel.

More long-term research is needed, but it is our belief that providing ergonomically supportive office chairs (stable and supportive, allowing for a range of motions and adjustments) has both short-term and long-term impacts on the musculoskeletal health of law enforcement officers. We also believe that more research should be done on the impact of ergonomics in the "mobile office", i.e. the patrol vehicles, on the health and safety of law enforcement officers.

Uses:

How might the products of your project be used within the target industry at the end of your project?

Is there potential for the product of the project to be used in other industries or with different target audiences?

The project clearly indicated that there is value for police departments to invest in proper office chair seating to improve the musculoskeletal health of their employees. Based on the results of our project, we believe that other police departments, both statewide and nationally, could benefit from upgrading their office chairs to ergoForce Police Task Chair, or an office chair with comparable features, including:

- 24-hour task intensive mechanism / durability
- Multiple points of adjustment for comfort of multiple users on multiple shifts
- Availability of variable seat pan sizes to accommodate taller officers
- Chair arms that easily swing away, both for comfort as well as easy chair exit
- Adjustable backs, which provide proper lumbar support without impeding on officer-worn equipment/duty belts
- Durable fabric

The project data was less clear on the effectiveness of the use of this particular brand of seat modification. Its applicability to other departments has become a moot point since Ford Motor Company has discontinued manufacturing the Crown Victoria model vehicle, forcing police departments to switch to different vehicle makes and models. However, the project does highlight the need to take into consideration the overall layout of the police "mobile office", including the seat configuration, as well as the value of active officer involvement in the design of the "mobile office". As some agencies may have already discovered, it is incredibly frustrating to spend \$30,000-\$50,000 on a brand new police vehicle, only to have some department employees who cannot safely fit into the new vehicle because of the seat profile, head room, or other considerations.

Regarding the seat belt extenders, we ultimately learned that not only are there differences in the buckles from one vehicle make to another, but that there are differences in buckles of different model years. While vehicle manufacturers do provide “floppy” seat belt extenders to customers for each particular make, model, year of a vehicle, they do not provide the more ideal “rigid” extenders available through third-party vendors. Unfortunately, third-party vendors only provide a handful of buckle types designed at vehicle makes and models, but ignoring the nuances of model year. Additionally, our City shop staff indicated that some seat belt extenders would void vehicle manufacturer warranties on seat belt function, increasing potential liability for the City in case of an accident. Furthermore, our department E.V.O.C. instructor expressed concerns about the potential for increased serious internal injuries as a result of changing the seat belt buckle placement by utilizing a seat belt extender, and strongly recommended the department discontinue using them.

Finally, the project illuminated the need for more research and development to be done in the area of duty belts and tactical gear carrying equipment. While some innovations appear promising, more needs to be done to address officer safety concerns across the board before a unilateral move can be made away from the technology that many have been using for over 30 years.

Additional Information

Project Type <input type="checkbox"/> Best Practice <input checked="" type="checkbox"/> Technical Innovation <input type="checkbox"/> Training and Education Development <input type="checkbox"/> Event <input type="checkbox"/> Intervention <input type="checkbox"/> Research <input type="checkbox"/> Other (Explain):	Industry Classification (check industry(s) this project reached directly) <input type="checkbox"/> 11 Agriculture, Forestry, Fishing and Hunting <input type="checkbox"/> 21 Mining <input type="checkbox"/> 22 Utilities <input type="checkbox"/> 23 Construction <input type="checkbox"/> 31-33 Manufacturing <input type="checkbox"/> 42 Wholesale Trade <input type="checkbox"/> 44-45 Retail Trade <input type="checkbox"/> 48-49 Transportation and Warehousing <input type="checkbox"/> 51 Information <input type="checkbox"/> 52 Finance and Insurance <input type="checkbox"/> 53 Real Estate and Rental and Leasing <input type="checkbox"/> 54 Professional, Scientific, and Technical Services <input type="checkbox"/> 55 Management of Companies and Enterprises <input type="checkbox"/> 56 Administrative and Support and Waste Management and Remediation Services <input type="checkbox"/> 61 Educational Services <input type="checkbox"/> 62 Health Care and Social Assistance <input type="checkbox"/> 71 Arts, Entertainment, and Recreation <input type="checkbox"/> 72 Accommodation and Food Services <input type="checkbox"/> 81 Other Services (except Public Administration) <input checked="" type="checkbox"/> 92 Public Administration
Target Audience: Law Enforcement Agencies; Ergonomic Health Specialists	
Languages: English	
Please provide the following information - - <i>(information may not apply to all projects)</i>	
# classes/events:	N/A
# hours trained	N/A
# companies participating in project	N/A
# students under 18	N/A
# workers	N/A
# companies represented	N/A
# reached (if awareness activities)	N/A
Total reached	N/A
Have there been requests for project products from external sources? No	
If Yes, please indicate sources of requests: N/A	

List, by number above, industries that project products could potentially be applied to.

92 – Public Administration

Potential impact (in number of persons or companies) after life of project?
 Law Enforcement Agencies Statewide

PART II

Financial Information Budget Summary

Project Title:	Protecting the Badge: Decreasing Musculoskeletal Problems in Law Enforcement Officers Through Workplace Ergonomics		
Project #:	2011WC00190/#K-1864	Report Date:	October 1, 2013
Contact Person:	Elysia D. Spencer	Contact #:	509-338-3344
Start Date:	March 28, 2012	Completion Date:	October 1, 2013

1. Total budget for the project	\$ 50,046.97
2. Total SHIP Grant Award	\$ 31,517.21
3. Total of SHIP Funds Used	\$ 14,322.58
4. Budget Modifications (if applicable)	\$ 0.00
5. Total In-kind contributions	\$ 18,529.76
6. Total Expenditures (lines 3+4+5)	\$ 32,852.34

Instructions:

- Complete the Supplemental Schedule (Budget) form first (on the next page).
- The final report must include all expenditures from date of completion of interim report through termination date of grant.
- Indicate period covered by report by specifying the inclusive dates.
- Report and itemize all expenditures during specified reporting period per the attached supplemental schedule.
- Forms must be signed by authorized person (see last page).
- Forward one copy of the report to **Jenifer Jellison, SHIP Project Manager at PO Box 44612, Olympia, WA 98504-4612**

PART II
(Continued)

*Financial Information
Supplemental Schedules (Budget)*

Project Title:	Protecting the Badge: Decreasing Musculoskeletal Problems in Law Enforcement Officers Through Workplace Ergonomics		
Project #:	2011WC00190/#K-1864	Report Date:	October 1, 2013
Contact Person:	Elysia D. Spencer	Contact #:	509-338-3344
Total Awarded:	\$31,517.21		

ITEMIZED BUDGET: How were SHIP award funds used to achieve the purpose of your project?

	Budgeted for Project	Amount Paid Out	Difference
A. PERSONNEL	\$0.00	\$0.00	\$0.00
Explanation for Difference and other relevant information: N/A			

	Budgeted for Project	Amount Paid Out	Difference
B. SUBCONTRACTOR	\$31,517.21	\$14,322.58	\$17,194.63
Explanation for Difference and other relevant information: <ul style="list-style-type: none"> 09/12/2012: Advance Check (Milestone #1): <u>\$15,547.01</u> 04/15/2013: Budget Amendment Request: Reduce project budget from \$31,517.21 to \$18,815.01 due to removing purchase of Duty Belt component 06/30/2013: Budgeted Items Not Purchased: <ul style="list-style-type: none"> (1) Did not install of remainder of modified patrol seats due to eval results (2) Did not purchase seat belt extenders due to manufacturing flaws & eval results (3) These changes & under-budget purchases led to new budget total: <u>\$14,322.58</u> 09/30/2013: Total grant funds expended: <u>\$14,322.58</u> 09/30/2013: Refund due to L&I for advanced funds (Milestone #1) ultimately not used: <u>\$1,224.43</u> <p>***NOTE: "Amount Paid Out" total of \$14,322.58 assumes posting of City of Pullman reimbursement check of \$1,224.43 of funds advanced but not spent***</p>			

	Budgeted for Project	Amount Paid Out	Difference
C. TRAVEL	\$0.00	\$0.00	\$0.00
Explanation for Difference and other relevant information: N/A			

	Budgeted for Project	Amount Paid Out	Difference
D. SUPPLIES	\$0.00	\$0.00	\$0.00
Explanation for Difference and other relevant information: N/A			

	Budgeted for Project	Amount Paid Out	Difference
E. PUBLICATIONS	\$0.00	\$0.00	\$0.00
Explanation for Difference and other relevant information: N/A			

	Budgeted for Project	Amount Paid Out	Difference
TOTAL DIRECT COSTS	\$31,517.21	\$14,322.58	\$17,194.63

	Budgeted for Project	Amount Paid Out	Difference
TOTAL INDIRECT COSTS	\$0.00	\$0.00	\$0.00

	Budgeted for Project	Amount Paid Out	Difference
TOTAL SHIP BUDGET	\$31,517.21	\$14,322.58	\$17,194.63

	Budgeted for Project	Amount Paid Out	Difference
F. IN-KIND	\$18,529.76	\$18,529.76	\$0.00
Explanation for Difference and other relevant information: N/A			

I hereby certify that the expenditures listed on this report were made with my approval:

Date

Signature of Project Manager

PART III

Attachments:

Provide resources such as written material, training packages, or video/ audio tapes, curriculum information, etc. produced under the grant.

Also include copies of publications, papers given at conferences, etc.

This information should also be provided on a **CD** or **DVD** for inclusion in the file.

REMINDER!!! All products produced, whether by the grantee or a subcontractor to the grantee, as a result of a SHIP grant are in the public domain and cannot be copyrighted, patented, claimed as trade secrets, or otherwise restricted in any way.