Naval Facilities Engineering Command (NAVFAC) manages the Ergonomics Center of Expertise, in support of the Chief of Naval Operations Mishap Prevention and Hazard Abatement (MPHA) Program. NAVFAC provides a wide range of no-cost products, services and technical knowledge to activities Navy-wide offering aid in mission readiness, prevention of musculoskeletal disorders, and reduction of associated costs. Ergonomics is fitting the workplace to the worker to prevent injuries and improve health and safety. You may be familiar with injuries such as Carpal Tunnel Syndrome, Tendonitis, or Back Strain in your workplace. These injuries are due to repeated traumas to the musculoskeletal system (muscles, ligaments, tendons, joints, bones) and nervous system when the job does not match the worker's capabilities. Redesigning the workplace to fit the worker can include providing reduced vibration tools to alleviate exposure, adjustable carts to reduce heavy lifting, or rearranging the work routine to minimize repetitive and unnecessary motions. A good ergonomics program can improve worker health and safety, morale, productivity and job satisfaction while reducing injury rates, worker's compensation costs and employee turnover. In the Navy, ergonomics currently represents the single largest source of civilian claims and costs and the second largest for active duty.

Please contact the Ergonomics Subject Matter Expert to request ergonomic assistance.

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Sierra Army Depot: Ergonomic Truck Inspection

FRC East AV8 Wing Handling

Navy: Anchored Ladder/Water Tight Fixture Repair

DoD EWG News Nov/Dec'12

Launch: Computer Workstation and Mobile Computing

Launch: OSHA eTool
The Navy Safety and Occupational Health Program Manual, OPNAVINST 5100.23G (0602.d(2)), lists this course as a core training requirement for Safety and Occupational Health Personnel.

This 4 day course is a hands-on, practical approach to ergonomics with extensive class exercises and case studies of Navy work environments. Upon completion of this course, students have a firm understanding of ergonomic principles affecting their work environment. Students assess ergonomics risk in the workplace using the Ergonomic Survey Tools from OPNAVINST 5100.23(series) Chapter 23. The course also covers Work-Related Musculoskeletal Disorders, workstation and task design, Navy and Marine Corps ergonomics policy, establishing an ergonomics program as well as computer and industrial workstation set-up and evaluation. Participants conduct an ergonomic assessment in the field at a Navy activity, analyze the data, and present their findings. Certified industrial hygienists, certified safety professionals and occupational health nurses can earn 4 certification maintenance (CM) points attending this course.

29 April '13 - 2 May '13 ~ Norfolk, VA (CDP 3555)

20 May '13 - 23 May '13 ~ San Diego, CA (CDP 09S6)

12 August '13 - 15 August '13 ~ Whidbey Island, WA (CDP 01DM)

Course Registration

New or Updated Tools and Documents

Sonography Ergonomics Guide

Posted 5 June 2012

Physical Risk Factor Ergonomic Checklist

Updated 31 May 2012
Computer Workstation Checklist
Updated 31 May 2012

Ergonomics for Dual Monitors
Updated Rev(1) 24 May 2010

Ergonomics Guide For Welders
Posted 4 May 2009

Chair Selection Guide
Updated rev(10)Jan 2011

Computer Workstation Self-Assessment
Updated 28 Aug 07

Poster: Time to take a Computer Break

Poster: printable 9x11 inches

New or Updated Tools and Documents

Navy Ergonomics Course

2013 PDC Ergonomics Awareness

New or Updated Tools and Documents

ROI: How to

Justify a purchase using return on investment (ROI)
Ergonomics -- Services

The Naval Facilities Engineering Command (NAVFACENGCOM) offers the following ergonomic support services, under the Navy Ergonomic Program to shore-based activities:

• Ergonomic Evaluations
• Hazard Abatement
• Training
• Technical Support

No-cost Ergonomic Evaluations of Industrial Work Activities

NAVFAC provides ergonomic evaluations of processes with identified ergonomic hazards. The activity is responsible for determining areas with potential ergonomic problems before requesting assistance. These evaluations are for industrial areas and not office environments. A Safety Professional or Industrial Hygienist may detect a potential ergonomic problem area through observation, injury data and/or employee feedback. An Ergonomist will conduct a technical analysis of specific operations and produce a detailed report with the identified hazards, recommendations with cost estimates, and job design improvements in order to reduce ergonomic stressors and improve occupational safety and health in the workplace. Ergonomic evaluations are based upon task analysis and interviews with workers, supervisors, and safety and health professionals. The Job Requirements and Physical Demands Survey is also used to assess ergonomic risk and prioritize ergonomic problem areas. This service is provided at no cost to the activity. Please contact the Ergonomics Subject Matter Expert to request ergonomic assistance.

Hazard Abatement

The NAVFAC Ergonomics Team is responsible for validating all Hazard Abatement ergonomic projects and is available to assist in answering technical issues to solve your ergonomic problem area. Navy activity commanders and commanding officers have the primary responsibility for correcting safety and health hazards affecting their personnel. This responsibility includes budgeting for and funding correction of hazards. However, funding is sometimes beyond the capability of the local activity and the claimant. To assist in these cases, the CNO Hazard Abatement (HA) Program, managed by NAVFAC, was established. Ergonomic projects are eligible for HA funding. The minimum funding threshold for ergonomic HA funding requests is $10,000. Additional information regarding the submission of a HA Project may be obtained by contacting the Hazard Abatement Project and Program Managers.

Training

The Ergonomics Team developed and presents the Navy Ergonomics Program Course (A-493-0085) for the Naval Safety and Environmental Training Center. This 4-day course is a core training requirement for safety and occupational health professionals. The course is designed to be a hands-on, practical approach to ergonomics with extensive class exercises and case studies of Navy work environments. Upon completion students will have a firm understanding of ergonomic principles affecting their work
environment. The course content includes work related musculoskeletal disorders; workstation and task
design; Navy ergonomics policy; establishing an ergonomics program and computer and industrial
workstation set-up and evaluation; and utilization of the Ergonomic Survey Tools from OPNAVINST
5100.23 (series). Participants will conduct an ergonomic assessment in the field at a Navy activity,
analyze the data and present their findings. We offer continuing education credits for certified
Industrial Hygienists. Technical Support

The Ergonomics Team:

• Assists in interpretation of Navy instructions and guidance documents pertaining to ergonomics
• Assists in selection of ergonomic tools and equipment
• Develops and shares best practices in ergonomics
• Develops Navy Criteria Documents
• Validates all ergonomic Hazard Abatement Program funding requests

Please contact the Ergonomics Subject Matter Expert to request ergonomic assistance.

Physical Risk Factor Ergonomic Checklist

The Physical Risk Factor Ergonomic Checklist can be used to evaluate and identify ergonomic stressors
in the workplace. The checklist determines if a work activity has ergonomic stressors present for
sufficient duration. For each ergonomic risk factor the checklist determines whether the physical risk
factors rate as a "caution" or "hazard." Risk of developing a Work-related Musculoskeletal Disorder is
increased when ergonomic risk factors occur in combination.

If a hazard exists, it must be reduced below the hazard level or to the degree technologically and
economically feasible. If the task rates a "caution," then it should be periodically re-evaluated since
changes in the work environment may create new ergonomic stressors. Ensure significant contributing
physical or personal risk factors are not present.
Download the fillable Physical Risk Factor Ergonomics Checklist

Computer Workstation Checklist

The Computer Workstation Checklist is a guide to assist in performing ergonomic assessments of computer workstations. The checklist includes an illustration to be left with the employee to guide them in setting up their computer workstation to the optimal neutral body posture.

Download the fillable Computer Workstation Checklist

Computer Workstation Self Assessment

The Washington State Department of Labor and Industries Computer Workstation and Mobile Computing self assessment tool walks the user through how to adjust and set up their computer workstation.

Launch: Computer Workstation and Mobile Computing
Manual Material Handling Checklist

This document is an aid for the identification of risk factors associated with manual material handling (MMH) and will assist you with reducing these risk factors. Manual handling refers to tasks that require a person to lift, lower, push, pull, hold or carry any object, animal, or person. This document focuses on the handling of objects and not the handling of persons or animals.

This checklist identification process assesses six factors: weight, posture and layout, frequency and duration, individual and object characteristics, and environmental factors. Potential solutions are given after each risk factor to reduce the stressors to the lowest amount feasible.

Download the fillable Manual Materials Handling Solutions Guide

Laboratory Ergonomics Checklist

The Laboratory Ergonomics checklist is intended for laboratory work settings and is a useful tool for assessing the workplace.

Laboratory Ergonomics Checklist.pdf
Job Requirements and Physical Demands Survey

The Job Requirements and Physical Demands Survey (JR/PD) is an ergonomic tool validated by the DoD Ergonomic Working Group. The JR/PD can be used by Safety and Occupational Health personnel to identify jobs with ergonomic risk factors, employee discomfort, and assess ergonomic stressors. The JR/PD may be used as a follow-up tool to the Physical Risk Factor Checklist or independently to quantify ergonomic risks and prioritize jobs or tasks for intervention.

Please contact the Ergonomics Subject Matter Expert to request JRPD forms and assistance.

Other advantages are:

- The JR/PD is easily administered to employees within one hour.
- The survey provides a means for employees to identify specific work processes, activities and tasks that are believed to be related to documented musculoskeletal discomfort or WMSDs.
- The survey results will aid in determining if a particular process should be classified as an Ergonomic Problem Area (EPRA). an EPRA is a work area where an association can be shown between ergonomic risk factors, employee-reported musculoskeletal discomfort and medically confirmed WMSDs.
- Results of the survey will prioritize EPRA-classified work areas for 'task specific' analyses and problem-solving efforts.
- Results of the survey provide an indication of the relative importance of ergonomic, psychosocial, and individual factors that may be present in the work area.
- Data from the survey will allow calculation of prevalence rates for employee-reported discomfort.
• The JR/PD will proactively identify areas with ergonomic risk factors before a WMSD develops.

• The JRPD can be used to baseline and trend the effectiveness of an ergonomic intervention.

For more information on the scientific basis and field survey methodology of the JRPD, please see the following documents.

Scientific Basis of the JRPD

Survey Methodology for the JRPD

General Ergonomic Awareness Web-Based Training

This course provides workers with knowledge of basic ergonomic principles, an understanding of work-related musculoskeletal disorders, and an awareness of the signs and symptoms of ergonomic risk factors. With this knowledge comes the ability to identify work activities with ergonomic risks, leading to early reporting and injury avoidance. • Targeted to employees, supervisors, military personnel and senior leadership

• Overview of ergonomics, risk factors, hazard management and control

• Satisfies OPNAVINST 5100.23G training requirement that ALL employees SHALL receive general ergonomics training

This course is available through Enterprise Safety Application Management System (ESAMS) as course number 371, General Ergonomics Awareness. If ESAMS is not available at your command you may access the site on the Navy Knowledge Online (NKO) website.
To access General Ergonomics Awareness training on NKO

• Logon to NKO at www.nko.navy.mil
• Under Learning, select “Navy e-learning>online Courses”
• Under Content select “Advanced Search”
• In Catalog Title enter General Ergonomics Awareness

To access ALL ergonomics training on NKO

• Logon to NKO at www.nko.navy.mil
• Under Learning, select “Navy e-learning>online Courses”
• Under Content select “Advanced Search”
• In Catalog Code enter NFEC

Making Peace With Your Computer Workstation

This PowerPoint presentation contains speaker notes and can be used by safety personnel to train users on proper adjustment and working postures for their computer workstations. The module can also be used as a self-training session by users.

Making Peace With Your Computer Workstation Unzip

General Ergonomics~Construction and SeaBees
This PowerPoint provides some basic ergonomics principles and practical applications to construction workers.

General Ergo for Construction Unzip

Ergonomics Awareness for Supervisors

Ergonomics Awareness for Supervisors is designed to provide managers and supervisors a basic overview of ergonomics. The PowerPoint presentation includes information on ergonomics risk factors, work-related musculoskeletal disorders and their signs and symptoms. The presentation defines the roles and responsibilities of Navy managers and supervisors in the Ergonomics Program and shows the cost effectiveness of implementing workplace improvements to avert work-related musculoskeletal disorders.

Ergonomics Awareness for Supervisors Unzip

General Ergonomic Awareness

General Ergonomic Awareness Training is designed for all workers, managers, and supervisors as a basic overview of ergonomics. The PowerPoint presentation includes information on ergonomic risk factors, work-related musculoskeletal disorders and their signs and symptoms.
General Ergonomics Awareness Training

PowerPoint file, zipped

Ergonomic Awareness: Vibration

Ergonomic Awareness (Vibration) is designed for workers and managers as an overview of risk associated with exposure to hand-arm vibration. The short PowerPoint presentation includes signs and symptoms of hand-arm syndromes as well as methods to reduce risk.

Ergonomic Awareness Training: Vibration

Zip file

Computer Workstation Self-Assessment

Computer Workstation Self Assessment (Ergo-Checkup) is designed to guide you in adjusting your computer workstation to reduce exposure to risk factors associated with work-related Musculoskeletal Disorders. The short PowerPoint slide presentation includes information on neutral posture, and the proper adjustment of keyboard, chair, monitor and work surfaces.

ERGO-CHECKUP.PPS
Q. Can you recommend "ergonomic" keyboards with built-in wrists rests?

A. Keyboard selection is best when it is based upon personal testing. A single keyboard will not fit an entire user population. Trials allow the users to select the product that best fits their body / task. Vendors or office supply stores are fairly eager to 'loan' products. Keyboards, like shoes, come in many sizes and shapes. Some come with built in pointing devices, wrist rests, hot key functions, etc.

Wrist rests are often misused. Wrist rests are for resting NOT for typing; the hands should float over the keyboard when typing. Studies by NIOSH found wrist rest use to increase pressure in the carpal tunnel by 140% (when used during typing). If used the soft gel-type is preferred over hard plastic.

Some suggested keyboards with built in wrist rests (or soft palm rest areas) are as follows:

Go to: Microsoft1, Microsoft2, or Fentek

People with disabilities can be directed to the CITA program and may require specialized keyboards such as with large print, large keys....

The Center for Information Technology Accommodation (CITA)* in GSA's Office of Government wide Policy assists with technological and helps federal agencies comply with Section 508 of the 1973 Rehabilitation Act. Section 508 mandated that all government agencies and companies that conduct business with the government make their technology disability-friendly. The center is charged with educating federal employees on Section 508 and building the infrastructure needed to comply with the law.

Be wary of products labeled "ergonomic, as manufacturers are eager to label furniture and accessories "ergonomically correct" or "ergonomically designed", much like food products are liberally labeled "all natural" or "new and improved." In reality, no single product can be labeled ergonomic, because people
are different. A product (such as a chair) that meets the body type (or tasks) of one person might not fit the next. Therefore, what is ergonomic for one individual can cause injury to the other.

NIOSH* provides information on common alternative keyboard designs (Alternative Keyboards).

The DoD Ergonomic Working Group Guide* provides information on proper arrangement of a computer workstation (Step by Step Guide to Computer Work Stations).

Q. One of our employees has requested a program be installed on her computer that would automatically remind her to take breaks. Could you point me in the right direction? Are there any free programs out there? Any help you could provide would be appreciated.

A. Some of these 'reminder' programs can be quite annoying especially if they lock-out the computer requiring a mandatory break. We recommend those that have a reminder but can be bypassed if the worker is busy or in the middle of something and unable to take a break. As far as free programs go, I don't know of any. Some will allow you to download a trial version for a period of time.

There are many programs available. Here you may want to review. RSI Guard* by Gold Touch Technologies.

*This does not constitute an endorsement of any particular product. Neither the Navy nor its employees and agents warrant any product described in this report for any use, either general or particular.

Q. I have been experiencing neck and shoulder pain lately that seems to get worse at the end of the day. It started when my boss bought me a new 21” monitor for my desk. I love my new monitor and it makes it much easier for me to do my design work. I wear bifocals too. Is there anything I can do?

A. This is a great question and one we see frequently. While a large monitor can be a great help at work it can also be a "pain in the neck", particularly for bifocal wearers. There are many different types of bifocals and progressive lenses. If you are using the bottom portion of your glasses to view the screen
you may find yourself tilting your neck up to look at the monitor. This may cause or contribute to your neck and shoulder discomfort. You can try lowering your monitor by removing anything it sits on, such as a CPU or monitor stand. See if the monitor itself can be lowered, some flat panel monitors can be adjusted. As a last resort you can trying raising your chair, but make sure your feet are resting comfortably on the floor or a footrest and the keyboard is at elbow height. Adjust the monitor distance or the size of your documents so that you don't have to strain to see your work.

It is important your eyes stay healthy and you get an annual eye exam to keep your prescriptions current. You can discuss some possible options with your eye care professional for your next set of glasses. One option is a set of computer glasses. These glasses are designed for you to view the computer screen through the entire lens. Some computer glasses also have properties to reduce glare. There may even be some contact lens options available to you.

You should also make sure your entire computer workstation is properly adjusted. A good guide is the Computer Workstation Self Assessment PowerPoint presentation available in the Training and Awareness tab.

As always, if your pain and discomfort doesn’t go away, please contact your health care provider.

Q. Does anyone know what the ergonomically correct monitor height is for computers in offices?

A. We all come in different shapes and sizes. There is no one ergonomic monitor height. Monitor height is measured from the floor to the top of the computer screen (not the monitor housing). The best monitor height for the user will promote a comfortable neutral posture of the neck, back, and shoulders. Both ISO 9241 part 5 and the old ANSI HFS 100 (1988) require the entire viewing area of the screen be between eye level and 60 degrees below eye level. Your eyes naturally fall downward so you can easily view material slightly below eye level but if your monitor is too high you’ll probably tilt your neck up which can cause discomfort.

The standard convention is to accommodate a range from the 5th percentile female to the 95th percentile male dimensions. Sometimes with fixed workstations and a rotating population you have to accommodate more than one user at a single workstation. In order to accommodate the 5th percentile
female¿s seated eye height (ANSUR 1988), assuming she is sitting with her feet flat on the floor, the top of the screen can be no higher than 41.1 inches from the floor (adding 1.2 inches for shoe thickness and subtracting 1.6 inches for postural slump). However, that would make the bottom of the screen somewhat lower than 60 degrees below eye level for the 95th percentile male. If smaller females use a footrest and raise their chair, one screen height can accommodate both but some people consider footrests to be cruel and unusual punishment for short people. The 41 inch height only allows the workstation to conform to the minimum ISO requirement that the screen be below eye level. The ISO recommended location is with the center of the screen 35 degrees below eye level. To accomplish this requires the center of the screen 14.5 inches below eye level (at a viewing distance of 25.5 inches, which I consider to be a bare minimum), and even lower for farther viewing distances. Furthermore, the screen needs to be tipped back so the top of the monitor is not closer to the eyes than the bottom (in order to control for glare!), which creates an even bigger problem for the neck.

For a guide to setting up your office workstation go to Setup Guide.

Q. Does anyone know whether Navy or DOD ever put out some type of policy regarding use of 5-star caster chairs vice 4-star caster chairs?

A. We reviewed ANSI/HF 100-1988 American National Standard for Human Factors Engineering of VDT workstations and did not find a specific recommendation for the number of legs a chair base should have. Stability and matching the caster to the floor surface are mentioned. A 5-star caster base chair is considerably more stable than a 4-star caster base chair. A 4-star caster base chair can be a hazard if the user tilts back in it.

Referencing a classic Ergonomic text: Fitting the Task to the Human 5th ed - Kroemer and Grandjean: An office chair must fulfill all the requirements of a modern seat: adjustable height, swivel, rounded front edge of the seat surface, casters at a five-arm base and user-friendly controls.

The DoD Ergonomics Working Group (EWG) Evaluation of UNICOR chairs lists a five-star caster base as a minimum requirement under all categories of office chairs.
As a reminder the castors should be matched to the floor surface (i.e., carpet, carpet mat, vinyl, tile) to allow proper rolling friction.

Q. I have seen a lot of information about split keyboards and I was wondering if they are better than straight (normal) keyboards?

A. The optimal keyboard depends on the user. The Wave or split keyboard is the most popular alternative keyboard and while it has advantages, it is not for everyone. Split keyboards have a learning curve and are best suited for people with proficient typing skills. This type of keyboard is not commonly recommended for a "hunt and peck" typist.

The split keyboard may be difficult for people with narrow shoulders to use since the orientation of the keys may cause the elbows to splay out. A straight keyboard can work for people as long as they maintain a neutral wrist posture (middle finger inline with the center of the wrist).

If users have ulnar deviation (little finger angled towards the wrist), a split keyboard may help promote neutral wrist postures. A split keyboard can also help users with limited wrist mobility. Behavior modification can also help. Taping a pen or popsicle stick to the back of the wrist (or even just tape) can demonstrate to the worker if they are deviating their wrist.

For more information on alternative keyboards, refer to the National Institute of Safety and Health publication 97-148. NIOSH publications are free and many may be downloaded from their website: http://www.cdc.gov/niosh/homepage.html.

Q. A co-worker recommended getting some ergo information from a company called "HumanScale", which sounded fine to me, at first, but on the main page of their website, http://www.humanscale.com, is a picture of a backless chair called the Freedom Saddle Seat. This chair doesn't look very ergonomic to me and I have to hesitate when considering them for any kind of ergo information. Thoughts?
A. There are a lot of seating companies. I can't recommend any one chair that will work for everyone but there are some good chairs out there. Chairs are similar to shoes, on size does not fit all. I have tried the Freedom chair by Human Scale and thought it was pretty well designed. Herman Miller, Steelcase, and Neutral Posture all make good chairs in various sizes to best fit the user. Some of our favorite vendors also make some questionable products. The saddle seat may have some applications but it probably wouldn't be something I would recommend for an office environment or long-term seating. Even though it is called the Saddle Seat, the literature refers to it as a stool. It could be useful as a stool -- where visibility or accessibility are important -- maybe when the user does a lot of moving, twisting, turning or reaching. A saddle seat encourages the user to sit up straighter (in a more neutral back posture), but it can be tiring after time to sit without back support. A back rest is an essential feature for a chair in order to support the lumbar region and reduce fatigues. Unless you are a seasoned bike rider, a saddle seat can be uncomfortable.

It is also good to keep in mind that furniture vendors get awards and attention by developing new and different-looking items. The Aeron chair by Herman Miller is a good chair, but it's one of the few chairs that people remember by name because it is so unique looking (similar to the VW Beetle, PT Cruiser, and Mini-Cooper). A design award doesn't necessarily ensure that the product is ergonomic.

If you're in the market for a new chair, I suggest calling vendors and asking for samples for trial. Let your employees try out different chairs and select the chair that best suits them.

Manual Materials Handling

Q. I see workers at some of the larger home improvement centers wearing back belts. Does the DoN support the use of back belts?

A. Back belt use has not been shown to provide protection to workers performing lifting tasks (click for NIOSH study). Also the Navy has a policy against the use of back belts in OPNAVINST 5100.23E. Chapter 23 Ergonomics Program, 2305.a Hazard Prevention and Control, Note: "Activities shall not use back support belts or wrist splints as safety protective equipment. These devices are considered medical appliances, and must be prescribed by a credentialed health care provider who shall assume responsibility for proper fit of the device, treatment, monitoring and supervision of the wearer.

Having the worker remove their back belt (unless provided by a medical professional) is supported by NIOSH research and Navy instruction. A few problems with back belts: 1) Proper use; the back belt is
not protective if it is not cinched at the waist and supported by the shoulders. 2) Some workers experience the Superman syndrome as soon as they put the back belt on, that is they believe it enables them to lift larger packages. Back belts were designed to keep the spine in a neutral position while lifting, it does not do so if it is not worn correctly and it does not increase the workers strength during a lift.

Miscellaneous

Q. I was just given a small budget to purchase ergonomic products and I'm not sure where to start or what to look for?

A. With a small budget and a new program, it is best to look for "low hanging fruit" which are problems that are easily addressed. Look for inexpensive and simple fixes such as gloves, cushioned insoles, knee pads, rolling stools, and anti-fatigue matting. Simple fixes which bring immediate comfort can help give your program a positive image and build support. As your program grows you will want to prioritize your fixes and weigh the costs against the benefits. Benefits include improved health and safety as well as possible productivity increases.

B. When selecting ergonomic equipment, be aware that ergonomic product claims don't necessarily mean anything. Any product can claim to be ergonomic and it's up to you to make an informed purchasing decision. See if the vendor will lend you a sample for a trial. If so, make sure you include your employees in the selection process and survey the employees for usability. Involving your employees will improve equipment acceptance and utilize employee experience. If you can't borrow a sample, consider purchasing one for an in-house trial. Some manufacturers offer return policies which will allow you to test a new product. Always make sure that any new equipment matches the operation being performed and the workers performing it. Determine whether the product addresses the ergonomic risk factors in the job, without creating new risks. Be sure to document your successes and expenses in order to justify your funding.