

Testimony on Ergonomic Policy (v.3h) written submission

Submitted by Don Patterson, DataHand Systems, Inc.,
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My name is Don Patterson. From twelve years working with DataHand Systems, Inc., makers of the DataHand ergonomic keyboard, I have seen ergonomic perplexity from the vantage of both workers and employers. I have also experienced work-related musculoskeletal pain.

My statement, today, responds mostly to the last of the posed questions. The first two questions have no provable answers, so the challenge of policy is to equitably respond to ergonomic need without having to answer either of these questions.

Last year, trying to help fix the flaw in the Clinton ergonomic policy, I suggested an assistive program intended to benefit all stakeholders. My proposal to create an OSHA Ergonomic Demonstration Grant Program aimed to reconcile the needs of industry and labor, providing reliable information about the costs and benefits of practical, workplace remedial alternatives. This information is needed to overcome confusion, anger, frustration, and fear on both sides.

Policy must enable cooperative solutions meeting everyone's needs. The demonstration program must be equal to the size and cost of the ergonomic tragedy. The program must prove and affirm effective ergonomic answers about many diverse work processes—without delay.

Over the past decade, with Procrustean heroism, policy makers have tried to force work-related musculoskeletal injury and disability (MSD) to fit a policy intended for other less complex workplace injuries. One way or another, this effort was destined to fail. Policy abandonment by the Congress was preferable to catastrophic operational failure.

The Clinton rules were a Holy Grail to some, but they delivered only a pig-in-a-poke to workers while placing a costly continuing burden of palliative charity on the backs of companies. Better policy is essential, so the adversarial contest can be ended and help delivered.

Ergonomic policy must fit the injury; the injury cannot be forced to fit pre-existing policy. Until ergonomic policy meets the needs of both employees and employers, it will be fought either politically or in the courts—at great continuing expense to all. An insightful, inspired, collaborative, political solution to this impasse is essential.

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Neither the argument for improved policy nor my accompanying policy proposal opposes ergonomic rules; rules must be part of any fair ergonomic program—but rules without assistive information about cost-effective remediation demands disastrously costly, uncoordinated, inefficient, duplicative, trial and error ergonomic research by all employers at once. Much of the resulting information would be proprietary and not readily shared. This problem along with the enormous shortage of reliable remedial information underscores the need for federal assistance.

Without help getting through the serpentine maze of possible ergonomic answers, the simultaneous investigative agony by employers nationwide would be as painful for employers as MSD is for workers. Good answers are often not intuitive, and wise ergonomic policy should deliver value to all stakeholders, including taxpayers and consumers.

Small companies, especially, cannot carry the burden of a policy unsupported by reliable, remedial information, but even large companies need affirmed and reliable answers before they can execute effective ergonomic programs without inefficiency, waste, delay, and frustration. Many companies would act—if they knew what to do. They do not know, and they are waiting for the help needed to find out.

The policy required to answer this need can be written once the unconstructive, unresolvable debate over cause, blame, diagnosis, and medication is set aside. Then practical, remedial alternatives capable of reducing workplace stress can be determined and provably affirmed. Having seen much money spent without fixing the problem, many companies will not do anything until they see credible answers.

Individual workers, trying to fix their pain at their own expense, have often tried a dozen or more potential answers of all kinds before they may have found one that works. Millions of workers are searching for answers the best they can on their own.

If blind-groping for answers had been required in every workplace in America simultaneously, OSHA might never have lived down the nightmare of expense, frustration, and confusion. Some companies have spent millions on highly touted ergonomic solutions only to find them valueless. The long delay in producing wise ergonomic policy has been bad enough without making it worse through the delivery of insufficient policy possibly costing employers dearly—without helping workers.

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As an example of the existing confusion, some companies have bought workers new chairs costing as much as \$1000 each, only to find them little more than a partial answer. Work-related stresses usually result more from work processes than from postural support, even though chairs can provide valuable, even essential, secondary benefit.

Like all afflictions and illnesses, exposure to physical stress does not impact all workers equally, and palliative remedies are like band-aids on a compound fracture. They cannot help much or for long in the face of incessant re-exposure to the same musculoskeletal stresses. The American cultural tendency to look to shortcut medication, symptom relief, and palliative remedies to answer every ache or pain cannot address MSD, any more than aspirin can answer AIDS.

Effective ergonomic policy must focus intelligent ergonomic design on cost-effective, productivity-enhancing ways to reduce physical stress in the workplace. Productivity improvement must be as important as stress relief. In addition, remediation must deliver a valuable return on the ergonomic investment. Nothing else can overcome employer resistance. Safety, health, and productivity must be addressed together, so workers can have hope for their future and companies can protect profitability.

Workers and employers both need help, but a policy burdening the bottom line of employers with costly continuing palliative inefficiency cannot work long for anybody. Under such a policy, ways will be sought to push injured workers onto disability, externalizing the cost and often transferring the burden to taxpayers. Such a policy treats workers as a disposable commodity. It sweeps the issue under the rug and looks for answers, as the song says, "in all the wrong places."

The future must be hopeful, not an endless burden. Good policy can prevent much worker disability, and it can also help those who work in fearful, sometimes angry silence—until their musculoskeletal damage may become permanent. Work-related musculoskeletal injury can be effectively addressed only through stress-reducing, productivity-enhancing innovation in tools and work processes.

Fifty years ago, the United Mine Workers Union worked with industry to make mine work both more humane and more efficient. The union did not fight to preserve the maximum number of employed miners, so more generations of workers could have the opportunity to die with

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picks, shovels, wheelbarrows, and horse-drawn carts in mine explosions and cave-ins—or from black lung disease. They fought for safety, health, *and* efficiency, because they knew health, safety, and other union benefits could not be delivered without improved efficiency. Modern workplace ergonomics is the same kind of issue.

Many other examples of progressive cooperation between workers, unions, employers, and industry groups can be reported. Postal workers are not picketing against technological improvement at the Post Office. They want more of it, so work does not hurt, and so increased productivity can improve living standards. The Postal Service faces big competitive challenges; these cannot be addressed if either management or labor shortsightedly sandbags effective ergonomic innovation. Vision and civic courage are needed in many places to replace recalcitrance, fear, anger, and adversarial relations.

Workers and managers must work together to find and prove the value of effective, productive, profitable, practical answers to reduce workplace stresses—because no other answer can stop the epidemic of worker pain and productivity loss. The size and cost of this job makes government assistance essential, but the government investment can be paid for over time through increased tax revenues resulting from ergonomically practical and productive tools and processes. With government help, productive, cost-effective, profitable ergonomic answers can to be found, tested, proved, affirmed, and widely shared.

This brings me back to the first two questions Secretary Chao has asked these hearings to address. With full respect for the medical profession, musculoskeletal pain or ergonomic injury must be whatever workers say it is. If people are hurting, the only choice is to listen and respond with productive innovation to reduce the stresses causing or contributing to the pain—sometimes one worker at a time. Diagnostic technology is not yet good enough to prove or disprove every worker's pain. Some cases are definitive, but diverse symptoms can be perplexing.

Many people think all keyboard-related injury is Carpal Tunnel Syndrome (CTS), but in fact, only a fraction is CTS. Many different diagnoses and mixed diagnoses are found. Even when injury can be affirmed, work-related injury cannot be separated from secondary contributing factors such as hereditary proclivity, life-style, diet, alcohol

or drug consumption, smoking, other health conditions, sleep disorders, child care requirements, home maintenance work and housekeeping, second jobs, overwork, hobbies, television watching, sports, recreational pastimes, emotional trauma, bad marriages, or abusive relationships.

In the absence of policy to overcome this diagnostic impossibility, employers are justifiably logical in refusing responsibility for injury not related to work, but if no way is found to provide the incentive to address musculoskeletal injury regardless of its cause, the American population is not big enough, nor are healthcare pockets deep enough, to push an endless stream of people onto disability.

The national economic cost of ergonomic injury is more important to understand than the medical definition of ergonomic injury. Employers pay a big part of this cost, but even so, they have been more concerned about the cost of creating ergonomic programs than they have been about the less visible but larger cost of the continuing policy delay.

Even the decade-long half trillion dollars OSHA conservatively projects in medical costs, lost worktime, and lost productivity will prove to be only a fraction of the real cost. The Reed Group, publishers of the Medical Disability Advisor, recently placed the *annual* cost to companies (not counting other employers) of all kinds of workplace stress at \$350 billion. OSHA Director Jeffress stated years ago the agency's numbers were likely much too low, but the inaccuracy of the numbers was never explained.

The biggest cost in lost productivity is likely to be the cost of self-defensive worker slowdown by uninjured workers. Falling national productivity has been reported, but reasons have not been sorted out. Personnel policies forcing workers to manage ergonomic injury on their own—like body odor and halitosis—push the issue underground and raise the cost in lost productivity. Labor-management relations suffer as well. Quick accusations about fraudulent claims only polarize people, increasing anger and mistrust. For every worker possibly making a fraudulent claim, hundreds suffer silently for fear of job loss or career derailment.

Many, many workers take the anguish of MSD onto themselves, even blaming themselves unreasonably. Many employers and insurers do not want to hear about this particular type of pain, so workers do whatever they can to manage it on their own, sometimes at the cost of

permanent disability. Confidential interviews with many workers provide certain knowledge of this reality. This aspect of musculoskeletal injury does not show up in the official numbers; it is visible only to those with empathy enough to listen to the stories of many workers.

As recent press reports illuminate, official statistics under-count the true amount of worker pain. European nations report injury rates as high as forty percent of the national workforce. Americans cannot be greatly different from Europeans, but we do not get accurate numbers in the United States, because the facts have been driven underground by employer attitude and employee fear. Employer intimidation sometimes occurs, but it has not lowered the amount of injury—only the amount of reported injury. Oppressed people eventually find ways to extract a price for their pain from their perceived oppressor. That price may be extracted in lower productivity and unproductive employee attitudes.

Even uninjured employees, who love their jobs and would not dream of complaining about work-related stresses, are slowing down to avoid future health risks. This defensive behavior places an uncalculated burden on the nation's productivity. Even on Capitol Hill, workers practice this strategy every day. Last summer, during the recess, I walked from office to office discussing ergonomic policy with anyone willing to talk. People would not tell their personal strategies to a passing stranger unless they were hoping to find a better way. As many workers see it, no job is worth the risk of permanent injury. In the absence of help, people are scared.

Wise ergonomic policy is needed to protect the value of workers and the profitability of the companies. Many injured workers built the unprecedented prosperity of recent years, and now they reap pain in exchange for their efforts. For them, the American Dream has dried up.

Policy cannot and should not have to answer questions about cause, blame, and diagnostic analysis before action is taken. Again, the challenge of policy is to find an equitable, productive, and profitable way to get around these unanswerable questions. The only effective solution is to lower work stresses and improve productivity, so everyone can realize a better tomorrow through ergonomic progress. The proposed OSHA Ergonomic Demonstration Grant program is designed to identify valuable answers from those unable to yield a return on the remedial investment—and a hopeful future with much less pain and disability.

Supporting Experience:

To illustrate the kind of innovation I believe possible—if policy will encourage it, an example from my own experience with the DataHand ergonomic keyboard is offered. I have been using the DataHand keyboard for almost ten years, having received the second beta unit manufactured in the early 1990s. The first unit went to a worker at Motorola in Phoenix, who is now retired, but she still uses her DataHand keyboard at home. The DataHand value comes from a total ergonomic rethinking of the keyboard paradigm. All nine stresses associated with the flat keyboard have been addressed.

In the past I drafted writing via dictation, doing editing and rewrite subsequently on the transcribed draft. Now that I have an efficient, less stressful, less athletically demanding keyboard, it is faster to skip the dictation and do my writing from the start with the DataHand keyboard. I am roughly forty percent more productive with the DataHand keyboard than I ever was even after years of flat keyboard experience. Better still, at the end of the day I am not tense and exhausted. One of the biggest benefits of the DataHand keyboard is the reduced fatigue after many hours of continuous work. The DataHand advantage becomes most clear during the second half of the work day. That is when fatigue and stress become most intense for typical flat keyboard workers.

No medical claims are made by DataHand Systems; the DataHand benefits result solely from effective ergonomic design. For me about a month was required to become about as productive as I had been on the flat keyboard. To become fully productive I needed about six months, which is about the amount of time I needed to become fully productive on the flat keyboard when I originally learned it.

Over the years since the DataHand keyboard has been in the market, many testimonials have resulted and ninety-eight pages of these can be downloaded from the Testimonial page of the DataHand website. Productivity and injury testing of the DataHand concept has occurred in many places. People tell of their careers having been saved, but the introduction of a new paradigm is never easy.

Startlingly new and unusual ideas often are greeted with hesitancy and resistance. The status quo offers a sense of security, while change always introduces insecurity. Established defenders of the old paradigm

always defend it and tweak it in every possible way as part of a natural strategy to defend the known against the unknown. Manufacturers have bent the old keyboard, cut it in half, tented it, jointed it, cupped it, angled it, tilted it, but they still have not addressed more than a small fraction of its stress-inducing limitations. One doctor in California has called all these recent keyboard designs no more than a “ten percent solution.”

Change is driven by people with vision but also, in the case of computer keyboards, by those for whom the existing tool is painful, or threatening of future pain. One such worker is a medical transcriptionist in Lacey, Washington named Abigail Tolson. She works under contract out of her home. She pays all her expenses and provides her own equipment. She is paid by the delivered line of text. She has been doing this work for thirty years starting originally on the traditional flat keyboard. During those early years, she was able to produce an average of about 1200 lines of text per day (averaging 65 characters per line). Some days she could get up to 1500 or even 2000 lines per day (50 to 75 pages, with 30 lines per page), but afterward her hands were exhausted and numb. Often they would stay numb all night and even into the next day.

About five years ago, Tolson began to worry about getting seriously injured if she did not make a change. During this time, she learned about the DataHand keyboard and purchased one. Since she is a fast typist and a manually dextrous person, it took her about 90 days to get up to full productivity on the DataHand system, but once she completed the learning of the different DataHand touch, she was able to average close to 1600 lines per day with peaks as high as 2300 lines. She reports she has never experienced any numbness or sense of exhaustion in her hands since she started doing her work on the DataHand keyboard. She feels she will be able to work for as many more years as she wants; she is no longer fearful about injury if she works too much.

This average productivity increase of about 25% results in a significant income improvement, even though stress and fatigue reduction matter more to Tolson than the income. Without getting into the details of her actual income, which include bonus incentives and other features, it would be reasonable to project hypothetical numbers. If a worker had been able to earn an annual income of \$32,000 working on the flat keyboard, a 25% increase would give that worker \$40,000

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annually. Without considering the initial learning time, that productivity increase amounts to an 800% annual return on the DataHand investment (\$8000 annual return on the \$1000 DataHand investment). The investment pay back period would be less than seven weeks. (This is the amount of time needed to earn enough to pay off the purchase cost of the tool.) Most people would consider an \$8000 annual return on a \$1000 investment quite satisfactory.

Most employers ought not resist ergonomic remediation capable of delivering this level of return. This does not even consider health cost savings which have also proven to be substantial. (One company reports a \$100,000 annual Workers Compensation saving resulting from a \$25,000 investment in the purchase of DataHand keyboards.) Of course, the learning time during the first year is an additional cost which would need to be factored into the total return for that year. Based on 90 days of learning time, the first year return would be 600%, if productivity were zero for those first three months, but productivity is not zero for even a month. Most workers can get up to their former flat keyboard speed within thirty days and up to half of their flat keyboard speed within a week or two. Conservatively, something in the range of 700% return on investment is achievable for the first year.* (see footnote on p. 13)

Not every keyboard worker knows the value of his or her productivity improvement as precisely as Abigail Tolson does, and most are not directly compensated for their true productivity. Many deliver the DataHand benefit to their employer without measuring it or expecting to be compensated for their improved productivity. This may be partially appropriate if the employer paid for the keyboard purchase, but some workers pay for the purchase themselves, if their employers will not, just so they do not have to suffer. For them relief from stress and fatigue seems to be enough to celebrate without worrying about the productivity value. Testimonials and worker interviews bear out this conclusion.

Many employers, also, often do not have a good way to understand the productivity results of their workers, regardless of whatever keyboard they may use. Often the work flow does not lend itself to clear calculation of the productivity value. Some companies just know the amount the DataHand keyboard enables them to save on Workers' Compensation costs. That, in addition to comfortable, pain-free workers, is enough.

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Of course, many MSD victims are not keyboard workers. Keyboard operators are only about a third of the stress injured work force. Many workers may perform work more complex to ergonomically improve than keyboard work, but people never know what can be achieved until they focus on it cooperatively. Once innovation is encouraged and assisted, startling things can happen. As long as innovation and creativity are retarded by negative attitudes and adversarial relations, stressful work methods will remain entrenched. Change happens when people start to believe in themselves and each other. This is human nature.

In some places, management-labor relations are so hostile, workers refuse and even sabotage good remediation just because they believe it is a management trick to get more production without paying for it. The statements of workers in some places have been just that clear, hostile, and mistrustful. Unconstructive attitudes must be overcome among both workers and managers. Sometimes, managers are unconstructive in refusing good ideas if they come from workers. Both attitudes are wrong, but they are the logical result of the hostile and unconstructive climate which has grown up around the ergonomic issue. Often workers have excellent ideas about how to improve work processes, but they may not speak up because their thoughts are not welcomed.

Americans have been able to do great things in the past through working together. American history has been a continuing lesson in the value of ingenuity. Once this ingenuity can be focused on the ergonomic need, surprising things can begin to happen in many places. Government policy can undermine or promote this process. Ergonomic rules without more information about the worth of remedial ideas are insufficient.

Conclusion:

- Because repetitive motion injury is difficult to diagnose,**
- because cases vary widely from one worker to the next,**
- because equal exposure does not result in equal affliction,**
- because ergonomic injury is difficult to define since humans respond to physical stresses in different ways,**
- because much response to ergonomic injury is merely palliative and cannot protect workers from reinjury,**
- because much medication is also palliative, managing symptoms without addressing causes, and leaves patients with substantial likelihood of reinjury when they return to work,**
- because employers do not want to invest in remediation without some benefit to offset the cost of the continuing palliative burden and reduced productivity of workers,**
- because workers need more than palliative programs to give them a positive future,**
- because primary causes of musculoskeletal injury cannot be separated from secondary contributing factors,**
- because workers need an end to their continuing stress,**
- because workers need an opportunity to contribute productively and increase their standard of living,**
- because good ergonomic answers can only be sorted out at present through agonizing trial and error with much cost and duplication without the effective sharing of credibly affirmed findings among companies and workers,**
- because the recent national prosperity has been built on the backs of many hard-working Americans who are now injured as the result of their labors,**
- because the number of injured workers can only be reduced by lowering work process stresses below the level of injury of most workers,**
- because innovation and ingenuity are required to lower the stress levels associated with tools and work processes,**
- because productivity and return on remedial investment is important to lowering the public cost of worker disability,**

the government needs to assist in assuring the discovery, testing, affirmation, and communication of the benefits and costs of a full range of ergonomic possibilities. This is necessary so companies and workers can have a better base of knowledge as they decide how to confront the current ergonomic confusion. The goal of this new government assistance would be to help identify the most cost-effective answers capable of yielding optimal benefits for both workers and companies, including restored and enhanced productivity for workers and a return on the remedial investment for employers.

Companies can continue to advance their own ergonomic research if they want to—on their own, but not all company executives feel they can afford to engage in costly investigation of a wide range of confusing alternatives without help. This is especially the case with many smaller companies. These companies could have been the most burdened by the Clinton ergonomic rules.

These smaller companies have proven capable of delivering more than their share of innovation, productivity increase, and economic benefit to the nation. Every reason exists to believe they can make a similar contribution to ergonomic innovation—if they can get the assistance and support they need to get started and begin to believe in the benefits and opportunities available to them and to others through cooperative, ergonomic innovation.

Cooperation to meet all the needs of both workers and employers can deliver benefit to taxpayers and consumers, as well. Once fears, frustration, and confusion can be overcome, benefits can result for everyone.

* **Footnote from Page 9:**

Following up on the productivity increase reported in the story of medical transcriptionist Abigail Tolson, mention could be made of a problematical keyboard study released in 1997 by the National Institute on Occupational Safety and Health (NIOSH). This report had great impact on the ergonomic keyboard marketplace, just as the recent Mayo Clinic CTS study could have now, not because the interpretation given the study was accurate but because it was released by a prominent institution whose work automatically gets major publicity. Almost immediately the conventional wisdom on the subject of ergonomic keyboards was set.

This study, directed by Dr. Naomi Swanson, found little ergonomic value in several of the alternative keyboards then available in the market. The findings of the study were largely accurate (as far as they went) even though a later study by prominent UCSF researchers at the Lawrence Livermore National Laboratory in California found modest benefit from the use of some alternative keyboards. The problem with the NIOSH study was in the way the findings were interpreted in widespread press coverage. The interpretation suggested: No alternative keyboard could ever have much impact on rates of injury among keyboard workers.

All the keyboards included in the study were marginally improved, modified versions of the basic, flat, QWERTY keyboard concept. Whatever modest benefit was later discerned by the Lawrence Livermore study may have been discounted by the NIOSH study as being too small to value—inasmuch as only a small fraction of the ergonomic inadequacies of the basic, flat keyboard design were addressed. The NIOSH study did not amplify any lessons emerging from its conclusions, even though the limited value of the modestly changed ergonomic keyboards supports paradigm change in search of a better answer. The NIOSH investigators felt no inspiration to draw larger lessons for their research.

This lesson is important because paradigm change resulting from focused ergonomic design will be required to effectively address many ergonomic concerns. Tool and process design must be fundamentally rethought to cost-effectively address all the parts that may cause or contribute to injury. This lesson is inescapable if benefit is to be brought to injured workers and to employers suffering from lost worker

productivity. If innovation is confined to changes fitting the established paradigm, improvements will likely be modest.

When the principal investigator on the NIOSH keyboard study was asked in 1998 why she had not included the DataHand keyboard in her study, her answer was illuminating. I asked the question personally knowing that NIOSH had a DataHand keyboard in its possession at the time the keyboard study was conducted. Swanson is believed to have had the very same DataHand model Abigail Tolson has used for the last five years. Dr. Swanson answered saying she did not think anyone would be willing to learn any alternative keyboard if relearning would take longer than a week.

Such a decision, of course, can never properly be made without weighing the benefits in comparison to the capital cost, plus learning time. If the benefits were sufficient, a year of learning time might be justified! The DataHand keyboard requires of most relatively fast, transitioning, flat keyboard workers three weeks to a month to achieve prior flat keyboard speed. About 25% of learners require somewhat more than a month. The learning requirement follows a normal bell curve distribution with some workers being very fast and some being much slower.

One blind worker was tactilely developed enough to achieve 90 wpm in one hour of learning time. The peak of the bell curve, representing an average learning time for all workers, appears to be around three weeks. This is not the learning time needed to reach full productivity; it is the amount of time needed to equal or modestly exceed prior flat keyboard performance for those workers so far tested. As stated earlier, the achievement of full productivity takes longer. Maximum productivity takes refinement of increasingly nuanced levels of skill.

Most DataHand productivity studies conducted so far have been short term, and most have been conducted by companies testing their own workers during the first few weeks of training. Longer term, third party, independently-funded, prospective studies are needed to protect credibility and report clinically viable results.

At present, most DataHand keyboards are sold to injury victims, not to those demanding greater productivity. The DataHand keyboard was originally designed to address the productivity challenge, but focused

ergonomic design resulted in a keyboard greatly beneficial to stress-injured workers. The needs of stress-injured workers emerged strongly as the DataHand keyboard was entering the market, and this segment of the market has remained robust. While much data has been gathered over the time the DataHand keyboard has been in the marketplace and many testimonials have been collected, long term comparative studies involving hundreds of workers are needed to obtain dependable productivity averages—as well as to provide fully credible comparisons about rates of injury.

In the meantime, even if Abigail Tolson's story represents a productivity pinnacle, much room remains for less productive workers to yield a substantial return on investment. Even a return on investment one-quarter as good as the one hypothetically and conservatively associated with Abigail Tolson's story would justify more than a week of learning time to most people. At a quarter of the Tolson productivity, the purchase cost of the DataHand keyboard would be paid off in one-half year instead of less than seven weeks. A productivity improvement of less than three percent can pay off the cost of the DataHand purchase in less than a year, depending on worker wage level and the hours of keyboard work performed per day. In the Tolson example, a four percent productivity increase would payoff the keyboard cost in about a year, not counting first year learning cost deduction.

Anyone who did not think returns on investment in the 100 -800 percent range might not justify learning the DataHand system for productivity reasons alone would be called short-sighted. Unfortunately, most people are routinely short-sighted about many things. This even includes credentialed scientists who conduct academic research projects.

Many people are also handicapped by cynicism. Cynics automatically disbelieve anything sounding too good to be true. A working definition of cynicism is willingness to jump to easy conclusions on the basis of unrelated prior experience before evidence is gathered or examined on the present issue. Cynicism is a form of self-defeating, unconstructive laziness.

People have written letters to magazine editors and to Internet bulletin boards saying no keyboard could possibly be worth \$1000 or more (Abigail Tolson bought her keyboard more than five years ago at a

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time when the price was \$2000). This judgment, again, exhibits reactive thinking based on unrelated knowledge. Logical discipline is required to overcome such faulty analysis, but relatively few people have this quality of discipline, especially when the culture reinforces erroneous, short-sighted, and lazy thought under the umbrella of conventional wisdom. Many people jump to convenient, defensive conclusions in preference to taking the time needed to work their way to more prudent, thorough, and accurate conclusions.

A good assistive ergonomics program must help people avoid these self-defeating, unconstructive patterns of thought. Open-mindedness to better, new alternatives is essential to the success of a good ergonomics program. Assistance with change management is also valuable in overcoming barriers when introducing innovation. If the experience of DataHand Systems, Inc. provides any clue, the benefit to the nation from a well-conceived, innovation-encouraging, ergonomic program can be surprisingly powerful. Once attitudes are positive, cooperative, and collaborative, amazing things can be achieved.

Copies of the OSHA Demonstration Grant Program proposal can be downloaded from the Public Affairs page of the DataHand website at www.datahand.com. A limited number of hard copies are available for distribution today. Thank you for the opportunity to present these views and to assist in the formulation of wise national ergonomic policy.

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This testimony was written using the DataHand ergonomic keyboard, Professional II model attached to an Apple Macintosh G3 PowerBook computer. For more information about the DataHand ergonomic keyboard, see the website of DataHand Systems, Inc. at www.datahand.com or call the company at 800-875-7171.