Appendix VI-B. Summary of Case Studies of Ergonomic Programs/Interventions

#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
270	Automobile Manufacturer	3711	Redesigned tools, fixtures, and work organization in assembly operations.	Reduced long-term upper extremity and back disabilities; CTS surgeries reduced by 50%.	Not Reported	"Summary of Studies on the Effectiveness of Ergonomic Interventions" (June 1995). (Ex. 38-65)
324	Motor Vehicle Assembly	3711	UAW negotiated ergonomics provisions in their national agreement in 1987. Early phases of ergonomic programs identified additional cases of MSDs by encouraging reporting and symptom surveys.	Not Reported	Incidents of CTDs declined from 4% from 1997 and 26% in the last five years.	(Ex: 32-185-3)

Appendix VI-B. Summary of Case Studies of Ergonomic Programs/Interventions

#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
180	Automotive Assembly	3711	The most significant change from the old facility was the design of the assembly line. The line varies in height from one work station to another, preventing excessive reaching, bending and twisting. In addition, the plant installed hundreds of lift devices to aide in the installation of the instrument panel, roof, battery, steering pump, radiator, trailer tow package and spare tire. the plant also uses tilted part bins, shock-absorbing tooling, and a wheeled scooter allowing low tasks to be done while sitting instead of stooping. Finally, the plant employs a 15 member ergonomics committee, and virtually all employees have been through a 1 hour training course on ergonomic risks.	Not Reported	The plant has the lowest cumulative trauma disorder rate of any of the company's assembly plants, 3.03 per 100 workers. The plant also has one of the lowest overall incident rates in the automobile industry, even though the average age of its workforce is 49 years of age.	Gregg LaBar, "Chrysler is Sold on Ergonomics," *Occupational Hazards*, (10/94, p. 209). (Ex: 502-22)
70	Auto Body Assembly, Fixing Side Molding to Body	3711	Replaced pneumatic nut runner with a lighter model. Used a stepped ramp that allowed workers to select an appropriate position relative to the work piece.	Not Reported	Upper-body MSDs were eliminated.	Oxenburgh (1994) (Ex. 26-1041), Case 50
72	Spray Painting Auto Bodies	3711	Lengthened spray gun trigger to increase gun's grip diameter and allow the trigger to be operated with three fingers.	Not Reported	Cases of hand tendinitis were eliminated.	Oxenburgh (1994) (Ex. 26-1041), Case 52

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
68	Auto Assembly	3711	Introduced variable height car conveyer belt, articulating arms to move large parts, like dashboards, into place. Also redesigned tools.	Not Reported	50% decline in ergonomic related injuries in the first year. 35% decline in second and third years.	LaBar (1992) (Ex. 26-1053)
67	Truck Manufacturing, Various Jobs	3711	Introduction of company ergonomics program in 1990. Engineering controls: substituted machine riveting for manual riveting, introduced raised work heights, and installed lifting devices. Introduction of job rotation for 85% of the workforce.	Lost-time injuries fell from 80 to 28 in 2 years. Lost workdays fell from 1,402 to 193.	CTD cases fell from 105 to 54 in 2 years.	Mandelker (1993) (Ex. 26-1063)
69	Auto Assembly Line Worker	3711	28 projects were redesigned to change specific jobs, making them ergonomically less troublesome.	Reduced from 3,134 lost days per year to 1,355 lost days per year after project completion.	Not Reported	Brandon (1992)
71	Spot Welding onto Auto Frame	3711	Fixed a large-diameter circular handle to the welding frame, which allowed the frame to be moved into any position while keeping the wrist in a straight posture.	Not Reported	Wrist injuries were eliminated.	Oxenburgh (1994) (Ex. 26-1041), Case 51

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
206	Truck and Bus Assembly Plant	3713	The company established an ergonomics program using a comprehensive team-oriented approach. To fix problem jobs, the company installed hoists, changed job procedures and modified lifting requirements. Most changes cost nothing. In fact, the company incurred costs for only 10% of the problem jobs it fixed.	The costs associated with work-related musculoskeletal disorders (MSDs) have dropped 14% each year in the three years since the program was implemented. Workers' compensation costs dropped from $1.4 million before the program to $544,000 three years later.	Not Reported	*Business Insurance*, (October 27, 1997). (Ex: 502-22)
73	Auto Instrument Panel Assembly, Manual Handling	3714	Installed a hoist system to remove panels from conveyor and transport them to shipping containers.	Lost-time back injuries associated with this operation were eliminated.	Not reported	Oxenburgh (1994) (Ex. 26-1041), Case 40
77	Automotive Engine Assembly	3714	A hoist was replaced by a conveyer belt set at waist height and part of the assembly process was automated.	70 days lost time and over 1,000 days on restricted duty were reduced to no lost days and no personnel on restricted duties.	Not Reported	Oxenburgh (1994) (Ex. 26-1041), Case 2
80	Auto Instrument Panel Sub-Assembly	3714	Spring clips were pushed into position using a hand tool that required excessive force to operate. New tool was designed to reduce force and awkward positioning of the hand and wrist.	Not Reported	Wrist and hand injuries were eliminated.	Oxenburgh (1994) (Ex. 26-1041), Case 49
81	Trimming Molding with Hand Cutter	3714	Hand cutters were replaced with automated or air-powered cutters.	Not Reported	Hand and wrist injuries associated with this operation were eliminated.	Oxenburgh (1994) (Ex. 26-1041), Case 54

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
74	Pneumatic Screw Feeder Operation, Auto Instrument Panel Assembly	3714	Installed a counter-balanced articulated arm to reduce the weight of the tool.	Not Reported	Upper-body MSDs were eliminated.	Oxenburgh (1994) (Ex. 26-1041), Case 46
76	Manufacturing of Electronic Components, Various Jobs	3714	Introduction of an in-plant ergonomics program, engineering controls including hand tool and workstation redesign, and lift devices. Job rotation and other administrative controls, work practice controls, medical management, and training also implemented.	Decrease of 50% from 116 lost-time days/100 workers (1990) to 58/100 workers (1991) for MSDs. Additional 50% decrease in 1992 to 29 lost-time days/100 workers.	The incidence rate of ergonomic disorders decreased by 67% from 37/100 workers (1990) to 12/100 workers (1992).	OSHA Site Visit Case Study No. 8 (Ex. 26-1178)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
75	Computer Operator	3714	The company instituted a biannual training program to emphasize good lifting and pushing techniques as well as good posture. Also instituted a stretching exercise program and encouraged the CAD operators to take frequent short breaks. Engineering controls included: • Purchasing 27 back cushions, 71 lumbar supports in three different sizes, 24 keyboard/mouse rests, and 12 document holders in the past five years; • Providing adjustable chairs; and • Providing foot rests for shorter workers.	Saved 20,000 hours lost time per year since eliminating CTD-related complaints.	Not Reported	"Communication drives process at Siemens." CTD News, (1997) (Ex. 26-1077)
78	Small Parts Assembly Machine Operation	3714	Jammed machine required operator to climb a bar ladder while carrying a heavy load. A correctly designed ladder and catwalk were installed along with a chute to dispose of damaged parts without the need for carrying them.	Not Reported.	Foot and ankle MSDs associated with the operation were eliminated.	Oxenburgh (1994) (Ex. 26-1041), Case 47

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
262	Engine and Transmission Assembler	3714	An ergonomic intervention approach was applied to the manual truing of flywheels. Incorporating worker participation, the truing task was chosen for evaluation and intervention based upon the number and severity of injuries associated with this task. Recommendations to modify the task were agreed upon and workers were videotaped while performing the truing.	An 82% reduction in restricted or lost work time.	A 29% decrease in the incidence of total musculoskeletal disorders, an 82% decrease in the severity rate, and a drop of 78% in the incidence of upper extremity disorders.	Appendix C "Summaries of Studies on Effective Ergonomics Programs and Interventions" (Moore, 1994). (Ex:32-339-1)
79	Automotive Air Conditioner Manufacture, Material Handling	3714	Installed overhead conveyor belt that moves the condenser cores through the various procedures, minimizing manual handling. Also installed box tilers to assist in packaging and scissors lift for stacking.	Prior to program, plant averaged 50 lost-time injuries per year, many of those back injuries. After program implementation, 2 back injuries were recorded over a 4-year period.	Not Reported	LaBar (1991) (Ex. 26-1078)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
184	Automotive Trim Mfg.	3714	The company decided to implement a corporate ergonomics program. Each of their facilities sent one engineer and one safety and health staffer to a three-day applied ergonomics class. Then all employees were given one hour of training in the ergonomics of how to work safely. Their design engineers were given four hours of training in how to design jobs with good ergonomics built in. Many practical workplace changes were made including: using tilt tables; changing to user-friendly tools; using proper lifting techniques; changing to adjustable workstations; optimizing the location of parts bins; using rotating carriers; using assistive lifting devices; and new-hire ergonomics orientation.	Not Reported	By 1998, the company cut their ergonomic-related injuries by 70%.	*C.D.T. News,* (April 1999). (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
181	Automotive Piston Mfg.	3714	The company committed to establishing a comprehensive ergonomics program. They started an ergonomics training and education program for their employees and as part of it, stressed the importance of early reporting of pains and symptoms to allow improved early medical management. They analyzed the workstations in their plant and where possible introduced redesigns allowing a greater degree of adjustment. Where redesign was not feasible, they instituted job rotation.	The ergonomics program established by this mid-sized manufacturer in the early 1990's not only improved their related occupational injury experience, but cut their workers' compensation costs by 47% and improved employee morale noticeably.	Not Reported	Human Resource Magazine, (October, 1995). (Ex: 502-22)
325	Motor Vehicle Parts Automotive Stamping	3714	UAW negotiated ergonomics provisions in their national agreement in 1987. Early phases of ergonomic programs identified additional cases of MSDs by encouraging reporting and symptom surveys.	Not Reported	Incidents of CTDs declined from 13% from 1997 and 24% over five years.	(Ex: 32-185-3)
284	Automotive Equipment Manufacturer	3714	An ergonomics program was put in place.	In 6 months, workers' compensation costs went down 87%.	In 6 months, recordable injuries dropped 53%.	Testimony of David C. Alexander. (Ex. 37-7)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
113	Auto Parts Manufacturing	3714	In 1996/1997 the company began implementation of their ergonomics program. Injury and illness data were used to identify incidents and areas where ergonomics related concerns were present. In response to analysis of these incidents, equipment modification has begun, including relocating two hand press controls and adding hoists and other mechanical lifting equipment. A medical management program has been started to identify musculoskeletal disorders before they become severe and provide better treatment for those that do occur.	Since beginning implementation of their ergonomics program in 1996/1997 this mid-sized manufacturer has reduced their lost work-day injuries and illnesses by 50%. The severity of those incidents that are occurring has also been reduced.	Not Reported	OSHA case files (Ex: 502-22)
313	Automotive Products Manufacturer	3714	A participatory ergonomics program with multi-disciplinary representation was implemented.	From 1993 thru 1997, an overall reduction of 42% was achieved in workers' compensation.	From 1993 thru 1997, MSD claims were reduced by 85%.	(Ex. 500-71-57)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
158	RV/MH Door, Window Mfg.	3716	With the aid of a physical therapist, the human resource manager assessed jobs on the production lines and eliminated excessive hand/wrist twists and pinching motions. Tools, originally designed for men, were replaced with smaller ones that better fit the smaller hands of the predominantly female workforce. Management officials introduced safety committees, job rotation and awards programs. They also added employee education and training and a new reporting system to detect work-related musculoskeletal disorders (WMSDs) in the early stages.	Not Reported	In 1994, work-related repetitive motion injuries had dropped by 20 percent, and the company was able to self-insure.	Preventing Repetitive Motion Injuries," *HR Magazine*, (Oct. 1995). (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
82	Manufacture of Jet Aircraft Engine Parts, Various Jobs	372	Implementation of ergonomics program, including engineering control measures, work practice controls, medical management, education, and training. Controls implemented included redesigning workstations to provide employees with more room to perform tasks, adding anti-fatigue mats and adjustable footrests, removing or padding tables and shelves to reduce contact stress, and installing vibration-absorbing pads onto grinding wheels.	Not Reported	Decrease in carpal tunnel syndrome cases from 26 in 1988, 11 of which required surgery, to 1 case in 1992 which did not require surgery.	OSHA Site Visit Case Study No. 9 (Ex. 26-1179)
332	Helicopter Assembly	3721	Three labor management teams formed in areas with highest injuries to determine causes. Teams received training and bring problems to the attention of management. Management must respond in 2 weeks. Budget in place for recommended engineering changes.	Lost work day and severity rates have dropped 75%. Worker compensation costs have dramatically improved. Production time decreased by 33% in areas where changes implemented.	The total OSHA recordable incidence rate dropped by 25% in one year alone.	(Ex: 32-339-1-1)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
224	Aircraft Manufacturing	3721	Starting in 1993, The company started a major effort to educate, train and encourage their workforce to "move smart." They made the design of manufacturing tools and related manufacturing processes a top concern. Their approach to education and prevention has been multi-pronged. They have a goal of training a member of each organizational unit in ergonomic evaluation and problem-solving. This enables routine ergonomic evaluations to be performed locally and complex problems to be referred to their professional ergonomic staff.	Not Reported	Since 1993 ergonomic-related injuries have dropped by a third.	The Everett Washington Herald (7/12/99). (Ex: 502-22)
379	Sheet Metal Mechanics	3721	Comprehensive program of education, job placement, job modifications and medical management designed for employees based on individualized risk assessments.	Increased total recordable case incident rate and hours worked per employee. Decreased total lost-time case incident rate, lost-time severity rate, and workers' compensation costs per employee. Benefits to cost ratio of 16.5/1.0.	Not Reported	(Ex. 38-131)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
328	Avionics and Commercial Aircraft Manufacturer	3721	Program consisted of management commitment and employee involvement. Program elements such as work-site analysis, hazard prevention and control, medical management and training and education.	Normalizing the lost-work-days per average headcount shows a decrease from 6.28 lost workdays per person in 1992 to 1.59 in 1995 (25.3%).	Musculoskeletal and cumulative trauma disorders dropped from 79% of reported cases in 1989 to 44% in 1995.	(Ex: 32-339-1-76)
170	Aircraft Engine Component Manufacturer	3724	This employer implemented their ergonomics program by emphasizing their employee training program and implementing a program of process improvement to remove or reduce stresses responsible for soft tissue injuries from their assembly lines.	Within three years of joining the Maine 200 Pilot program and strengthening ergonomic training and process improvement efforts, this employer had by 1996 reduced their lost time injuries from a previous high of 112 to 10, and their workers' compensation from a high of $280,00 to $54,000.	Not Reported	OSHA case files (Ex: 502-22)
249	Aircraft Parts Manufacturing	3728	Boeing founded its ergonomics program on OSHA's "Ergonomics Program Management Guidelines for Meatpacking Plants." Over the course of two years, Boeing spent approximately $800,000 towards improving the condition of furniture, lighting and tooling.	In 1995, lost workdays dropped to 1,651. By 1996, the number dropped to 600 days.	By 1995, the injury rate had dropped to 3.8 per 200,000 man hours. Finally, MSDs accounted for only 44% of recorded injuries in 1995.	Lance S. Perry, "Step-by-Step Planning: The Ergonomics Lessons Learned at Boeing Offer Insight for Assemblers Putting Together Their Own Programs," *Assembly*, (3/1/97). (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
83	Shipbuilder	3731	Initiated training classes covering the nature of CTDs, anthropometry, work physiology, back and wrist anatomy and proper work techniques. In-depth training course covered tool selection, work habits, alternating trigger fingers and hands. Workers participated in evaluating and developing interventions for the welding department, and selecting pistol grip and in-line based tools so as to keep the wrists in a neutral posture. Installed scaffolding at the right height and distance from the work, and used ladders or installed scaffolding to higher positions for the work above shoulder height.	Decreased to only 6 lost-time ergonomics wrist injuries through November 1996, since training completed in June 1995. Eliminated lost time back injuries since July 1995.	Eliminated wrist injury in the welding department until March 1996. Reduced ergonomics case rates about 30 percent during 1996.	Training a 'limbsaver' at Newport News." CTD News (1997) (Ex. 26-1079)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
223	Shipbuilding	3731	The company decided to establish a formal ergonomics program. Injury and illness records were analyzed to identify high risk departments for priority intervention. These jobs were evaluated and interventions identified. In-depth employee training on tool selection, work habits and mechanical equipment utilization was begun. Ergonomically stressful welding operations were replaced by improved processes. Material handling and scaffolding use were analyzed, improved techniques identified and introduced with additional training.	Two years after establishing a broad based ergonomics program the company's lost-time ergonomic case rate fell 55% and they realized savings of $1.4 million in workers' compensation costs.	In two years following the establishment of their ergonomic program their ergonomic case rate fell 30%.	CTD News,(January, 1997). (Ex: 502-22)
84	Motorcycle Manufacturing, Flywheel Milling Operations	3751	Introduction of lighter flywheel castings and an overhead lift; introduction of a customized deburring machine eliminating vibration exposures; introduction of a customized 40-ton press eliminating the use of the brass hammer.	MSDs involving lost or restricted workdays dropped from 27.6 per 100 workers in 1989 to 12.5 per 100 workers in 1993. The severity rate of MSDs dropped from 610 lost or restricted workdays per 100 workers in 1989 to 190 days per 100 workers in 1993.	Not Reported	McGlothlin and Baron (1991) (Ex. 26-1080)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
85	Assembly of Pressure-sensing Instruments	3823	Forceful turning actions were required to fit an O-ring in place. Cordless screwdrivers were used with a custom attachment to bring wrists into stronger position and allow hand to employ a power grip.	Not Reported	Wrist and arm MSDs were eliminated.	Oxenburgh (1994) (Ex. 26-1041), Case 44
179	Medical Equipment	384	The company hired an industrial ergonomist and simultaneously began a formal safety program. Ergonomic awareness became a visible part of the company's daily decision making process. 3M redesigned workstations, adding adjustable chairs, repositioned computer keyboards and relocated video terminals.	Not Reported	One of the company's departments experienced a 64% drop in its injury and illness rate following adoption of the company's ergonomics program. Injuries and illnesses declined from 5.4 to 1.61 incidents per 200,000 hours worked. Ergonomic changes played a significant role in the improvement.	3M pilots ergonomic program to reduce OSHA recordables," *CTD News*(1995). (Ex: 502-22)
277	Medical Device Assembly Plant	380	Redesigned workstations to reduce reach distances, provided adjustable chairs and foot rests, provided fixtures and pneumatic gripper to eliminate pinch grips.	Plant-wide severity rate reduced from 154.9 to 67.8 lost time days per 200,000 worker hours.	Plant wide CTD incidence rate reduced from 13.7 to 11.3 per 200,000 worker hours after intervention.	"Summary of Studies on the Effectiveness of Ergonomic Interventions" (June 1995). (Ex. 38-65)
309	Medical Device Production	384	Ergonomic interventions included new work stations, assembly fixtures, and ergonomic training of employees to improve manual assembly methods.	There were 321 lost work days and since new program there has been no additional lost-work-days.	Since the program there have been no new CTD's. They were reduced from 14 to 0.	(Ex. 500-114)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
86	Medical Needle Manufacture, Inspection Station	384	Used task forces to identify jobs involving worker exposures to risk factors. Identified problems on quality control line and implemented design changes to the workstations.	Not Reported	Achieved 75% reduction in upper extremity MSD cases	Benden (1994) (Ex. 26-1081)
87	Manufacture of Suction Canisters Used in Surgical Procedures	3841	Introduction of an ergonomics program utilizing a medical management program, employee training program, job rotation, and engineering controls. Controls implemented include replacing old wooden supply stations with ergonomically designed stations, and automating various processes.	Not Reported	Decrease in the ergonomic injury rate from 5.2/100 workers (1989) to 2.8/100 workers (1993).	OSHA Site Visit No. 16 (Ex. 26-1183)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
130	Manufacturing Kidney Dialysis Machines	3845	The company organized an ergonomic task force consisting of employees from its engineering and manufacturing departments. The task force determined that three areas needed attention: workstations, tools and training. They selected new workstations to alleviate problems associated with reaching and bending. The new workstation allows parts to be placed in bins on articulating arms that workers can pull toward them as needed, also eliminating unnecessary reaching. They replaced all hand tools and conducted extensive training on the proper ways to use the new equipment.	A videotape analysis revealed that the new workstations required 61% fewer reaches than the old models. Since installing new workstations, the company has recorded a 85% reduction in lost workdays from 1990 to 1993. Because the new workstations reduce the number of movements and amount of time needed to assemble the machines, productivity has also increased.	Not Reported	"Ergonomic Initiative Reduces Worker Claims," *Assembly,* (9/1/94). (Ex: 502-22)
88	Manual Handling of Bulk Paper	386	Two operators manually lifted large wads of paper from a trolley. Manual lifting was eliminated by installing a scissors lift. In addition, the trolley's runners were replaced by roller bearings that enabled the paper to be loaded onto the scissors lift without manual lifting.	Not Reported	There were 18 back injuries in one year prior to implementing changes. There have been no back injuries in the 3 years since modifications were made.	Oxenburgh (1994) (Ex. 26-1041), Case 36

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
357	Flatware and Hollow-ware Silver Manufacturer	3914	Reduced manual handling and awkward postures present in affected jobs. Purchased lifts to eliminate manual handling, installed a chute to eliminate the need for employees to carry heavy bags, and designed an inclined adjustable support to reduce awkward neck and shoulder postures.	Total lost workdays have dropped from more than 300 in 1992 to 72. Total workers' compensation dollars for the company dropped from $192,500 in 1992 to $27,100.	Back injuries declined from 7 to 2 (71%).	(Ex. 502-404)
89	Manufacturing Board Games, Inspection and Packing	3944	Job analysis and problem solving involving employees to redesign packing workstations. Design changes included raising the height of conveyors, slowing conveyor speed (no effect on throughput), placing roller conveyors on an incline to facilitate carton removal, and changes in work procedures.	Not Reported	Eliminated all cumulative trauma injuries associated with job.	Cook and Marcotte (1990) (Ex. 26-1082)

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				Lost Workday MSDs	Total MSDs	
111	Fitness Equipment Manufacturer	3949	The company formed a committee to brainstorm on ways to reduce work-related musculoskeletal disorders (MSDs). The company purchased adjustable workstations and began rotating jobs. They adopted a new clamp that reduced both the number of times that the clamp was opened and closed and the force needed to operate it. The company provided time during the day for stretching and flexibility exercises.	Not Reported	In the three years since the program was implemented, there has been only one case of carpal tunnel syndrome in the racket stringing department. The case was detected early through medical management and was treated without surgery. The ergonomics program also increased employee morale.	*Professional Safety,* May 1987 (Ex: 502-22)
251	Feather Duster Manufacturing	3991	In 1998, the company established an ergonomics program. Winding machines, used to rotate duster handles while lambs wool or feathers were attached, were redesigned to remove an upper extremity stressor. Employees were trained on wrist relaxation exercises and encouraged to take frequent exercise breaks.	Since 1998, they have cut lost work days by more than 95%.	By instituting an ergonomics program in 1998, this small feather duster manufacturer was able to cut their rate of ergonomic-related injuries by 80%.	OSHA case files (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
90	Railroad Repairmen	40	Introduced storage of tools and materials off the ground between knee and shoulder height; devised winches to lift and handle heavy equipment; and redesigned work tables, dollies, and carts to more easily handle train car parts.	Lost-work days reduced to zero for back injuries.	Low-back injuries reduced to zero.	McMahan (1991) (Ex. 26-1083)
246	Railroad Car Maintenance and Repair	4011	This railroad asked the Safety Research Division of the Association of American Railroads to train its safety professionals to conduct ergonomic evaluations for manual material handling. To analyze tasks in the repair shop, the railroad involved its safety professionals, line managers and employees. Then, jobs were redesigned to reduce the risk of back injuries. Today tools and materials are stored off the ground between knee and shoulder height. Employees now use winches and carts or dollies to lift heavy equipment.	The company estimated a benefit/cost ratio of 10 to one for the changes. Productivity increased by more than 67% with no change in staff size. Low-back injuries and the associated lost workdays were eliminated, and absenteeism dropped to 1%.	Not Reported	Fitting work to workers," Railway Age, (August 1991). (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
335	School Bus Drivers	4151	They identified flaws in bus designs and came up with 9 specific areas needing improvement. New buses have ergonomic seats with many adjustments and support areas, power assisted doors and tilt steering wheels.	Worker compensation claims in the last five years have dropped by a third.	Not Reported	(Ex: 500-10-1)
91	VDT Operator, Package Delivery Service	42	Introduced sit-stand workstations that permit workers to adjust workstation to meet specific needs.	Not Reported	Reduced MSD cases by half in 12 months.	Nerhood and Thompson (1994) (Ex. 26-1084)
92	Freight Truck Terminal Operations	4213	Established ergonomics program in response to rising number of back injuries. Program elements include analysis of injury records to identify hazardous operations, extensive use of lifting and carrying devices, providing extra personnel to handle heavy or awkward freight, employee training, and medical management of injured workers.	There were 7 lost-time injuries in 1989, followed by 4 in 1990 and 5 in 1991.	Total number of MSD cases declined from 13 in 1989 to 7 in 1990.	OSHA Site Visit No. 5 (Ex. 26-1177)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
239	Telephone Utility	481	Since 1995 this facility has completed several weeks of training seminars aimed at office ergonomics. They have also performed ergonomic workstation evaluations to identify repetitive motion stressors that are present in their workplaces. Some upgrading of workstations has occurred, such as the installation of larger monitors. More upgrading remains to be done, including making their workstations more adjustable.	In the two years since starting their program in 1996, the number of associated lost work-days has been cut by 75%.	In the two years since starting their program in 1996, their rate of ergonomics-related cumulative trauma injuries has been cut by a third.	OSHA case files (Ex: 502-22)
93	VDT Operation, Tele-communications Establishment	481	Retrospective study of the impacts of an ergonomics program on 500 VDT operators. Program included job task analyses, workstation redesign, and worker education and training.	Not Reported	Number of upper extremity disorders over the 6 months prior to implementation of the program was 49; this was reduced to 24 for the 6 months following intervention.	Tadano (1990) (Ex. 26-1337
122	Telecommunica-tions	481	This company developed an $18 million ergonomics program, providing education, training, brochures, and interfocal eyeglasses for video terminal operators.	Workers' compensation claims were reduced by 33%.	Not Reported	Joanne Wojcik, "Ergonomics Proves Worth," *Business Insurance,*(11/1/93) (Ex: 502-22)

Appendix VI-B. Summary of Case Studies of Ergonomic Programs/Interventions

#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
258	Nuclear Power Plant	4911	Initiated an ergonomics program in 1995 in response to a growing number of repetitive motion injuries among computer users found on their OSHA 200 log. Interventions, in the form of ergonomically designed furniture, were installed and then evaluated for effectiveness in follow-up visits. Education and training were also provided.	Not Reported	Within weeks, 9 of 27 employees in the pilot program had their symptoms disappear altogether, while 6 additional employees said they experienced significant improvement. Following the success of the pilot program, the employer implemented the program for the entire workforce. Of 81 cases with medical symptoms, 97% of all employees had their symptoms disappear, improve significantly, or show some improvement following the introduction of ergonomic furniture. In 1996, the employer had no recorded OSHA 200 log work-related injuries for the first time in their history.	Appendix C "Summaries of Studies on Effective Ergonomics Programs and Interventions" (Fernberg, 1997). (Ex:32-339-1)

Appendix VI-B. Summary of Case Studies of Ergonomic Programs/Interventions

#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
94	Materials Handling, Electrical Utility	4911	Redesigned equipment: • Weight of the water coolers reduced from 10 lbs to 5 lbs. • Rotating platform for transformers. • Step and grab handles added to trucks. • New shovel handle and new pry bars. • Position of the kegs on trucks was lowered to minimize twisting of the back.	Lost time injuries reduced to 0.42 per 100 employees in 1989.	Injuries due to getting in and out of trucks reduced from 9 to 0 in year following redesign. No injuries from lifting the water kegs since the changes.	"Foiling field injuries with ergonomics." Electrical World (1990) (Ex. 26-1085)
387	Electric Utility's Warehouse System	4911	Four methods were used to evaluate the risk of exposure to injury before or after ergonomics intervention: the 1991 NIOSH lifting equation, the Static Strength Prediction Program, the Lumbar Motion Monitor, and the Borg psychophysical assessment of effort.		Results from applying the four methods to the re-engineered tasks showed that the probability of low-back disorder factors was reduced by as much as 29%, the percentage of people capable of performing tasks was increased by as much as 90%, the NIOSH Lifting Index was reduced from above 2.0 to less than 2.0, and the psychophysical assessment of effort was consistently reduced from the "heavy or strong" to the "light or moderate" range.	(Ex. 500-41-93)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
354	Electric Utility	4911	This company establish an ergonomics program focusing on the prevention of back injuries. They established a training program including such basics as how to ensure you get into the best possible position and how to carry, set up and take down a ladder safely. Back biomechanics proper lifting techniques are also covered and are reemphasized repeatedly.	Not Reported	Since starting their ergonomics program, focused on back injury reduction and using a back-to-basics approach, the company has reduced their incidence rate by 25%.	(Ex. 502-404)
95	Data Entry Operator, Gas and Electric Utility	4932	• Engineering controls: workstation design. • Administrative controls implemented.	Lost time due to work-related injuries decreased from 1,008 hours/month to 584 hours one year later.	Not Reported	Couch (1990) (Ex. 26-1086)
282	Waste Management	495	Program includes analysis of occupational accidents, revision of the safety procedures manual, participatory training classes, improving and evaluating working procedures and personal protective equipment, etc..	Not Reported	The number of compensated low-back pain cases has been reduced from 330 in 1986 to 87 in 1994, a 73% reduction.	"A Follow-Up Study of Preventive Effects on Low Back Pain at Work sites by Providing a Participatory Occupational Safety and Health Program". (Ex. 500-71-60)
96	Sewing Machine Operator	5137	Installed padded, swivel chairs with adjustable backs and improved materials handling methods. Also instituted an exercise program.	Not Reported	Incidence rate of tendinitis decreased from 12% to less than 1% in some plants.	Hammond-Smith (1990) (Ex. 26-1087)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
97	Material Handling, Grocery Distribution Center	514	Implemented comprehensive program that included hazard identification and job hazard analysis, medical management and reassignment of injured employees, worker training, and implementation of engineering and work practice controls. Controls included making minor modifications to some forklift equipment, replacing other equipment, and providing ergonomically designed workstations for data entry personnel.	Not Reported	Number of MSD workers' compensation claims declined from 14 in 1989 to 8 in 1991.	OSHA Site Visit No. 4 (Ex. 26-1176)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
248	Food Service Distributor	514	The company formalized its ergonomics program under the leadership of its occupational health nurse. The company started by instituting an early return to work plan. Workers were encouraged to report any symptoms. The company re-racked its warehouse and put brakes on the hand trucks. The company assessed its customers' locations for hazards during delivery and worked with its customers on improvements. The company also worked with its suppliers to get smaller bags, handles on packages, sturdier cardboard and lighter boxes.	Just one year after implementing its ergonomics program, and the cost of workers' compensation cases was down by more than 45 percent. For the first eight months of the company's fiscal year 1999, total costs were down to about a quarter of the 1996 total.	Just one year after implementing its ergonomics program, the company's injuries and illnesses had dropped 25 percent. For the first eight months of the company's fiscal year 1999, major back injuries have dropped from 76 to 21.	Presentation at the Applied Ergonomics Conference, Houston, (March 1999). (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
380	Large Commercial Nurseries	5193	The team selected for intervention specific high risk jobs involving the manual handling of plants in 1 and 5 gallon plastic containers. A set of handles for carrying and moving plants was developed. In focusing on manual materials handling, they looked for opportunities to do things which would have a positive effect on risk factors for WRMSDs and the modifiers used to calculate the revised NIOSH lifting equation. These were: 1. improve coupling (grip), changing it from a pinch to a power grip if possible. 2. reduce moments by getting the load closer when lifting and carrying. 3. improve trunk and upper extremity posture. 4. Reduce the speed &/or acceleration of lifting movements 5. reduce the amount of force require	Not Reported	All measures indicate large-magnitude reductions in targeted risk factor exposures, including extreme stooped postures, repetitive finger pinch grip, and repetitive lifting and lowering of containers.	(Ex. 500-26)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
207	Lumberyard	5211	The site began to formalize and improve their overall safety program by documenting their program's operation and policy in a manual. Their ergonomics program was separated out and strengthened in 1995. They invited an ergonomist from Ohio State Workers' Compensation program to survey their site and used his recommendations to improve their program. They use ergonomic checklists to have each of their employees evaluate the ergonomic appropriateness of their personal protective equipment, mechanical equipment and workplace. They completely redesigned their office workstations in 1994.	In early 1997 they were awarded OSHA's VPP STAR status. They have not had any lost time injuries since starting their VPP application process.	Not Reported	Linda Hill, Weyerhaeuser Customer Service Center, Safety Program Administrator, phone call (7/15/99). (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
131	Retail Sales	53	The company established ergonomics as part of their overall health and safety program. An active case management program was established to aggressively manage existing claims. Detailed workplace risk assessments were performed, focusing on material handling and repetitive motion risk factors. Job redesign and rotation were introduced as well as on-the-job exercises. Additional mechanical handling equipment was purchased. Training sessions on proper ergonomic lifting techniques were conducted.	Not Reported	From 1992 to 1997, ARC recorded a 60% drop in CTD-related claims, an 86% drop in total incurred losses from all injury cases and a 79% drop in the average cost per claim.	*CTD News*,(January, 1998) (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
247	Catalog Distribution Center	5311	The company implemented an ergonomics program. The program included four basic elements: ergonomics training, work-site analysis, medical management and a formal communication process. The company identified 22 activities associated with MSDs, which affected about 75 percent of the workforce. The company developed an alternate duty plan to get injured workers back to their jobs more quickly and installed an ergonomics hotline to enable employees to make suggestions immediately.	Not Reported	The company injury and illness incidence rate dropped from 12 in 1992 to 6 in 1995–a 50% reduction. The company completely recouped the cost of the ergonomics program in three years and is now saving about $500,000 per year as a result of the program.	Presentation at the Ergonomics: Effective Workplace and Best Practices Conference, Chicago (1997), NIOSH proceedings. (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
351	Retail Grocery	5411	An ergonomics committee was formed to address MSD problems. They purchased adjustable work tables, semi-automatic wrapping machines, and a re-designed meat cutting knife. Purchased vertical scanners for the checkout counters and trained employees.	Not Reported	They had reduced MSD claims from 47 in 1991 to 26 in 1992.	(Ex. 502-404)
225	Grocery Stores	5411	The company implemented an ergonomic program in 1987. The company analyzed and modified the check stands. For about $500 per stand, the company raised work heights, purchased checker fatigue mats, lowered produce scales, raised keyboards and placed them on adjustable pedestals, and made the grocery bag wells adjustable to accommodate varying checker heights. An ergonomist met with employees several times to train them on ergonomics and demonstrate how to adjust the new equipment.	Not Reported	In eight years following implementation of the ergonomics program, only two workers have developed confirmed cases of MSDs. Since 1990, the company has reduced its experience rating (a Washington State Dept. of Labor & Industries formula involving incidence rate, medical claims, and time loss claims) by almost 43%.	Food retailer rewrites user, safety manuals for safer workplace," *CTD News,* (1995). (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
364	Retail Grocery	5411	Modified its checkout stations and scanners to reduce lifting and twisting motions. Medical management program ensured immediate care and treatment. Training on causes and symptoms of work related MSDs and on good work practices.	Not Reported	Over a 4-year period, workers' compensation claims for MSDs dropped from 21 to 5.	(Ex. 502-404)
98	Restaurant Worker	5812	Reduced the amount of food served by the workers, and heavy porcelain crockery replaced with plastic.	Not Reported	Reported injuries decreased 40%.	Oxenburgh (1994) (Ex. 26-1041), Case 17
99	Clothing Store	5932	Staples were reduced to one per tag and job rotation was introduced so that no one person stapled for more than 45 minutes at a time.	Not Reported	In 1994-1995, 23% of pricers had CTDs; 2 had bilateral carpal tunnel releases and were unable to return to work. In 1996-1997, 10% of pricers were affected, but all have returned to their jobs without surgery or impairment.	"ARC takes thrifty approach to ergonomics." CTD News (1998) (Ex. 26-1089)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
177	Banking	60	The facility initiated their ergonomics program by evaluating their injury and illness experience to identify when, where and how incidents were occurring. They also surveyed their employees to identify what they did and did not like about their current workstations. Using these results workstations were redesigned to reduce the stressors associated with data entry. Their process relied heavily on worker involvement and management responsiveness to focus their efforts on reducing workplace injuries.	An ergonomics program focused on office soft tissue injuries enabled this Maine 200 Pilot program participant to cut both their ergonomic related injuries and workers' compensation costs by 50% in three years.	Not Reported	OSHA case files (Ex: 502-22)
100	Data Entry	6021	Adjusted workstations and lighting.	Not Reported	Reduced neck tension syndrome from 54% to 16%.	Luopajarvi et al. (Undated) (Ex. 26-1090)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
250	Insurance and Financial Services	63	The company began developing its own ergonomics program in the early 1990s. As part of the program, the company implemented "software usability labs" that "engineer out" any key combinations that put the hands in an awkward position. The company also designed its own work tools when it found no commercial products were adequate. For example, the company designed a large-handled staple puller when it found that standard pitch-type removers were causing discomfort, the company also designed a special workstation for a woman with painful back pain and carpal tunnel syndrome. The workstation included a desk that can be used while sitting or standing and a redesigned keyboard. Additionally, the company has conducted over 7,200 one-on-one ergonomics consultations with workers, trained most of its 20,000 workers, and made over 38,000 adjustments to workstations.	After an expected initial increase in reported injuries, the company saw a sharp decline in cumulative trauma disorders. Ergonomics injuries made up 66% of workers' compensation claims in 1992, but only 48% of all of compensation claims in 1997.	Not Reported	Michael Bradford, "This company was Honored for Excellence in Ergonomics: Program Prevents Injuries, Decreases Workers' Comp Costs, Improves Morale," *Business Insurance,* (10/26/98). (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
355	Insurance Carrier	63	Established a three-pronged intervention process: 1) Created a corporate infrastructure with the expertise to respond to ergonomic success in workstation design and technologies. 2) Departmental evaluations. 3) Post-injury management process.	In the first year of their program the costs-per-claim of computer-related disorders fell 30%. In the first year of their program surgery rates for computer-related injuries fell 90%.	Not Reported	(Ex. 502-404)
350	Insurance and Financial Services	63	In 1986, the company revitalized its two main headquarters facilities to accommodate ergonomic concerns. The company redesigned workstations. Workers now have indirect, overhead lighting and glare-filtering window shades, adjustable ergonomic chairs, acoustical panels and increased space.	The company's productivity increased 64%. Absenteeism decreased 14%, and the company's worker turnover rate decreased 86%.	Not Reported	(Ex. 502-404)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
163	Insurance	63	Since 1989, the company has implemented the following changes: *Purchasing 900 "ergonomically correct" chairs at the end of 1990 in an attempt to ease low back pain and carpal tunnel syndrome. *Using "lower cost" accessories, such as glare screens, articulating keyboards, and document holders. *Initiating educational programs and training for supervisors and management. *Since 1993, providing ergonomically-designed workstations and indirect lighting in the company's new buildings. *Remodeling older buildings with ergonomically correct office equipment. *Hiring two full-time corporate nurses. In 1993, the nurses helped create an on-site electronic job-site questionnaire requesting information on employee comfort.	The company realized an 80% drop in CTD-related compensation costs from 1992 to 1995. Specifically, CTD-related claims and costs have fallen from 103 and $526,000 in 1991 to 21 and $25,000 in 1995, respectively.	Not Reported	*CTD News*, (4/96, p. 7). (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
173	Disability and Life Insurance	6311	They established a comprehensive program addressing office ergonomic concerns. Their first emphasis is engineering the problem out of the workplace. They apply ergonomic principles at the time of purchase to all office upgrades and additions. They are aggressive in individualizing workstations to each employee. Employees are measured anthropometrically to maximize the fit and trained at the time of hire and yearly thereafter. Workplace employee safety and health teams are used.	Their lost workday case rate is 0.3 per 100 employees compared to an insurance industry average of 0.8. Their average lost time claim cost (ergonomic) is under $1,000 compared to an industry average of $19,000.	Not Reported	Lynn Pontius-Gaudette, Head of Safety, UNUM Provident (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
226	Indoor Arena	7349	The arena hired a team of ergonomists, who observed, filmed and analyzed the changeover process. Eventually, existing equipment was used in a different way, and forklifts, floor jacks and stacking dollies eliminated heavy lifting. The ergonomists developed a "drill" for moving the basketball floor using two different forklifts and two different crews on one section of floor. Previously, the process involved simply hoisting each section onto a forklift. The new method eliminated 90 % of heavy-lifting tasks. In order to refine the process even further, one employee invented a new tool (the Harvey bar), which allowed the changeover to be performed not only more safely, but also more quickly.	*$399,825 saved in workers' compensation funds *458 fewer workdays lost *$200,000 improvement in net profit (revenue of arena's operations) *Lowered absenteeism *Injured worker recovery	*39 fewer injuries (claims filed) *50-60 % improvement in worker performance *50-55 % improvement in productivity *100 % improvement in morale	Ian Chong, "An Ergonomics Boost for the Tacoma Dome," *Occupational Safety & Health*, (2/97, p. 56). (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
203	Computer/data Systems	737	The company commissioned an ergonomic study to evaluate the work environment in the data-entry department. Based on the results of that study, the company modified existing workstations to reduce the risk of injury. The company installed adjustable equipment and accessories to accommodate the company's multiple users and the various work shifts.	Over a two-year period, the company decreased the amount of their workers' compensation costs from $854 per employee to $17 per worker in data entry.	Not Reported	*Continental Airline Magazine*, March 1999 (Ex: 502-22)
353	Health Care	80	Purchased mechanical lifts and other assistive devices including gait belts. Employees required to use devices and attend training sessions on body mechanics.	Lost workday injuries dropped from 4 per month to only 4 per year in the first unit to use the devices. Throughout the hospital, lost workdays resulting from patient transfer injuries dropped from 15.9 to 13.1 days in 6 months.	Not Reported	(Ex. 502-404)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
218	Nursing Care	805	Starting in 1997 this facility initiated an ergonomics program addressing the hazards associated with the transfers of residents. This program included the formation of a safety committee, the purchase of improved mechanical lifting equipment, training on safe bio-mechanical lifting techniques as applied to patient transfers, the re-emphasis of teamwork between management and staff, and a strengthened program of workplace oversight to ensure good implementation of these changes.	The rate of lost work-days associated with injuries has been reduced by more than half.	Since 1996 their practical ergonomics program addressing resident lifting hazards has cut their rate of related injuries by two thirds.	OSHA case files (Ex: 502-22)
216	Nursing Care	805	This facility has addressed their industry's recognized ergonomics concerns by establishing and enforcing a mandatory no single person lift policy. They have supported this program by purchasing and requiring the use of mechanical lift assists on all resident transfers.	From 1996 to 1998 the applied ergonomics program in place at this small employers establishment cut the number of ergonomic-related injuries and the lost workdays associated with them by 80%.	From 1996 to 1998 the applied ergonomics program in place at this small employers establishment cut the number of ergonomic-related injuries and the lost workdays associated with them by 80%.	OSHA case files (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
176	Medical and Nursing Home Care	805	This facility brought several lifts into the facility for a trial period, encouraging employees to test them and provide feedback on the lifts they preferred. The company selected two types of lifts–one to bring residents from a sitting position to a standing position; and one to help residents who are unable to sit up by themselves. The facility purchased 15 lifts–one for every department and a spare to help ensure availability. The facility offers all CNAs training in ergonomics and in how to use the lift assists.	The facility reduced its workers' compensation costs for work-related musculoskeletal disorders by about 30% between 1994 and 1996. Costs dropped from $100,000 to about $70,000.	Incidence rate fell from 14.7 in 1993 to 12.3 in 1996. Employees are pleased with the new lifting equipment that the company is now buying additional lift assists for use in other areas.	Private Sector Ergonomics Programs Yield Positive Results, General Accounting Office, August, GAO/HEHS-97-163 (Ex: 502-22)
217	Nursing Care	805	The ergonomics program being implemented by this facility addresses safe lifting techniques as applied to transfers involving residents.	Not Reported	In the two years since establishing their practical ergonomics program (1996) which stresses safe bio-mechanical lifting techniques for resident transfers, this facility has cut their rate of related injuries in half and the severity of these injuries (as measured by lost workdays) by 40%.	OSHA case studies (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
209	Nursing Care	805	A management change at this center was followed by renewed emphasis on the ergonomic hazards associated with assisting patients with restricted mobility. This included training on proper lifting techniques, and use of mechanical lift assists both to improve patient security during these lifts as well as to reduce ergonomic stresses experienced by the staff certified nursing aides. An adequate number of lifting assist devices were obtained for the facility's staff and residents.	The lost work day injury rate at the center, which had averaged 8.3% from 1996 through 1998, fell to 2.4% after these changes were made.	Upper extremity musculoskeletal disorders, which had averaged 7.1% over this same time, fell to less than 1% in 1999.	OSHA case files (Ex: 502-22)
283	Nursing Home	805	The program included an ergonomic evaluation of patient handling, pilot testing and purchase of new equipment, a train-the-trainer program, and training of 347 nurses and other patient handling staff.	Not Reported	Over the course of the program (one year), the number of back injuries was 30% below the average of the prior three years, with the number of reported injuries in the final quarter approximately 1/7 of that for the three prior quarters.	"Short-Term Efficacy of Back Injury Intervention Project for Patient Care Providers at One Hospital". (Ex. 500-71-61)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
295	Health Care Facility	805	Introduce new lifting devices.	Not Reported	During 1991 and first 9 months of 1992, experienced 8 workers' compensation cases related to strains or sprains. Since new lifts (6 months) only 2 new cases reported, neither of which involved lost time or workers' compensation.	Testimony of Guy Fragala, PhD., PE, CSP. (Ex. 37-4)
175	Nursing Home	805	At the request of management a committee of nurses aides was formed to determine the cause and identify a solution for this concern. The solution that was decided on was to institute an ergonomics lifting program aimed at patient transfers. Mechanical lifting devices were investigated, tried, selected and put into use. Training on the proper use of the new lifts and on proper lifting bio-mechanics was provided. A policy of limiting unassisted lifts to 50 pounds was established.	Two years after starting their program, lost workday cases due to back injuries had been reduced by 80% and associated lost workdays by more than 90%.	Not Reported	Wall Street Journal, (March 20, 1995). (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
166	Nursing Care	805	The company established an ergonomics program addressing the lifting hazards associated with patient transfers. They established two safety committees, one to address changes in the physical plant and the other to focus on reducing injuries and illnesses. They changed their adjustable beds from mechanical hand crank units to electric powered ones to reduce ergonomic stresses affecting their staff's backs. They added powered lifts to their facilities to ease the stresses associated with patient transfers.	Not Reported	Three years after being invited to join the Maine 200 Pilot Program this nursing care employer's ergonomics and safe lifting program had reduced their total occupational injuries and illnesses by 40%.	OSHA case files (Ex: 502-22)
215	Nursing Care	805	This nursing center has established a practical ergonomics program stressing the safe bio-mechanical lifting of residents. This is presented to their staff through lectures, videos, handouts and demonstrations. It is repeated on a semi-annual basis. Mechanical lifting assists have been made available throughout the establishment.	Reduced the number of associated lost work-days by over 85%.	In 1997 and 1998 the practical ergonomics program stressing safe bio-mechanical lifting techniques at this small nursing care facility, cut the rate of related workplace injuries by almost 75% from what they were in 1996.	OSHA case files (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
294	Health Care Facility	805	Introduced mechanical lifts in four high risk units.	Not Reported	Average reduction in injuries over the 4 units was 73.75%. A similar facility in Wyoming also reduced injuries by 60% after mechanical lifts were introduced..	Testimony of Guy Fragala, PhD., PE, CSP. (Ex. 37-4)
300	Health Science Center	805	Ergonomics program included interventions such as worker assisting devices, equipment to help employees move patients. Training was also incorporated.	Lost time hours were reduced by 43% and in one selected nursing unit, it was reduced by 83%.	Back injury incidence rates fell 23%. In one selected nursing unit, there was a drop off of 39% in back injuries.	Testimony of Guy Fragala, PhD., PE, CSP. (Ex. 37-4)
214	Nursing Care	805	An ergonomics program stressing biomechanical safe lifting was begun in 1997. The program is administered and reviewed by an in-house ergonomics committee. It is audited by their corporate office on an annual basis.	Lost work-days associated with injuries have been reduced by more than 80%.	In the last two years this small nursing care facility's practical ergonomic program of bio-mechanics has cut their rate of ergonomics-related injuries by more than half.	OSHA case files (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
150	Nursing Care	805	The company contracted with a manufacturer of lift assist devices to assess their need for lifts, train their employees initially on the use of the lifts, and then follow up with additional training and other support. The employer purchased 7 lifts. Some were whole body lifts, and others were stand assist lifts. They then implemented a policy to require the use of the lifts for all resident transfers for residents that were less than 50% ambulatory. Employees who violated this policy were disciplined. This program had the full support and backing of management. The program was fully implemented in February of 1998.	The LWDII rate for the facility in the first 6 months of the program dropped to 3.9.	Not Reported	OSHA case files. (Ex: 502-22)

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#	Job Title or Activity	SIC Code	Ergonomic Program/Interventions	Reported Reduction in Injury Rates		Sources
				Lost Workday MSDs	Total MSDs	
211	Health Care Facility	805	In 1993, the hospital formed a Back Injury Prevention Task Force to identify and tackle back injuries. The team created department-specific recommendations for the work process through a multi-disciplinary approach. For instance, in the nursing department, which accounted for half of all back injuries, nurses began to use mechanical lifting equipment, slide boards and patient transfer belts. Further, a trained colleague taught nurses how to lift patients properly.	Lost time injuries were cut to 49 (down 35%) with 426 lost days (a 57% decrease) and 1,851 restricted days (a 54% decrease). Total workers' compensation costs related to back injuries in 1994 were estimated at $187,595, a 43% decrease from 1993.	In 1994, total back injuries had decreased to 85 (a 43% decrease from 1993), with 38 occurring in nursing (a 50% decrease).	Back program cuts comp costs, injuries, lost days," *Hospital Employee Health*, (July 1995). (Ex: 502-22)
305	Residential Institute	805	Program includes management support, employee participation, job-site analysis, purchase of equipment, workplace modifications, training, rehabilitation, and fitness programs.	Workers' compensation claims reduced by $150,000 (13%) in one year. Cost related to back injuries were reduced by 32%.	Carpal tunnel syndrome claims were down 50%.	Testimony of Bernice D Owen, PhD, RN (Ex. 37-5)