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INTEL CORP.

Intel's Hand Injury Success Story

Rapid, safe construction plays a critical role in the chip maker's success—yet recordables have plunged on its 50 million man-hour schedule this year.

by Brett Phillips and Brad Burris

Intel Corporation has been recognized throughout the world as a leader in the design and manufacture of integrated circuits for some time; and recently, Intel has begun gaining worldwide recognition as one of the safest places to work. Intel's safety performance has achieved world-class status and continues to improve as a result of detailed data collection and analysis and its focus on three main elements: 1) strong programs, 2) individual commitment, and 3) leadership.

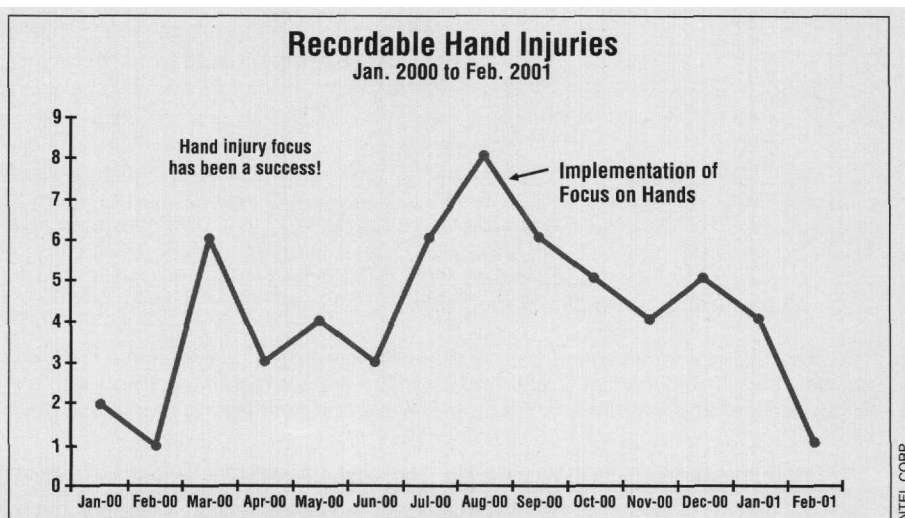
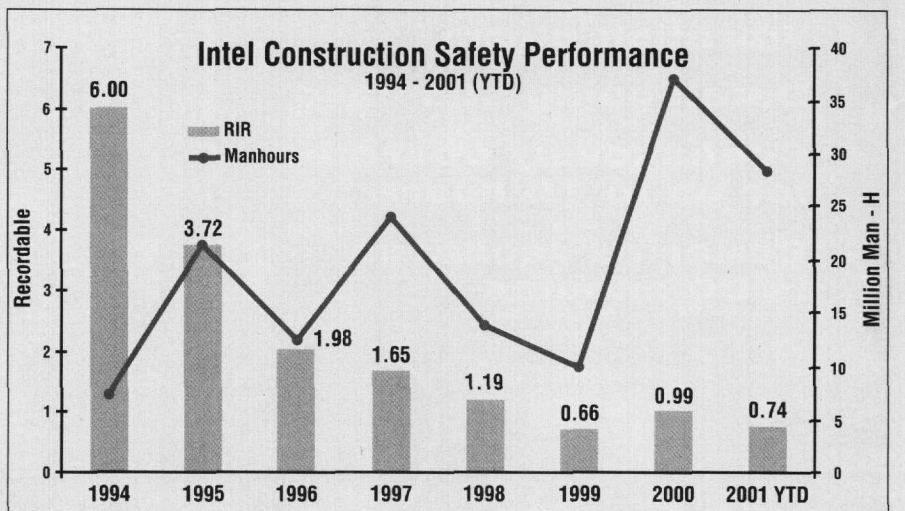
To illustrate just one of these three elements, the overall Intel safety performance results are briefly discussed here with a detailed review of Intel's continuous improvement process: Prevention of Hand Injuries at Construction Sites.

Since 1994, the Intel employee recordable rates have dropped 84 percent to a world-class level of 0.18 (2001 YTD). Just as impressive is the safety performance improvement that has been realized on Intel construction projects. From 1994 to 2001 YTD, the recordable rate on Intel construction projects has dropped 86 percent, to 0.86. Based on these results and Intel's innovative approach to safety, Craig Barrett, Intel's president and CEO, received the 2001 National Safety Council's Green Cross for Safety Award. To understand the significance of this accomplishment, one has to keep in mind that these rate reductions have occurred against the backdrop of phenomenal company growth, including a 200 percent increase in construction activity.

To meet the ever-increasing market schedules and demands for integrated circuits, Intel must build semiconductor fabrication plants ("fabs") and general-purpose buildings under intense schedule pressures. Intel is currently on pace to meet its 2001

planned expenditure of several billion dollars associated with construction. This correlates to approximately 50 million man-hours. Thus, rapid, safe construction plays a critical role in Intel's success.

When Intel's construction safety group looked for continuous improvement in already-low construction injuries at Intel sites, it leveraged the company's leadership position, the commitment of the trades,



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and traditional safety methodologies in a focused effort to eliminate all hand injuries.

Five-year construction injury data indicated cuts and lacerations were the most frequently occurring injury on Intel's construction sites. Of these injuries, the vast majority were cuts to the hands or forearms. Based on this data, Intel's Project EHS professionals, representing all six Intel regions throughout the world, developed a plan of action to achieve hand injury elimination.

Each trade contractor selected a training and communication method consistent with its own business practices. Some use traditional command-and-control, while others use innovative involvement techniques.

"Many cuts are caused by tools, such as utility knives, that some might call 'inherently dangerous,'" Jim Braun, Intel Projects EHS engineer, indicates. "There are alternatives that pose little or no risk of causing a cut to the hand or forearm. Our job is to convince construction workers that they should adapt the alternatives."

Tackling the Problem

Faced with the knowledge that reducing or eliminating hand cuts would make a dramatic impact on injury rates, Intel construction management and Intel Projects EHS set about engaging the entire construction community at Intel in solving the problem.

Task forces were formed for each of six major regional construction projects. These teams, made up of Intel, general contractors, and trade contractor representatives, initiated a traditional safety approach to assessing and mitigating risk. Using six key steps, the teams developed and implemented their plans.

Step 1: Assessing the Risk

Teams were tasked with developing trade-specific lists of tasks that posed the risk of cuts or other hand injuries. Teams interviewed crafts, reviewed incident investigation reports, and relied on past experience to complete their lists. These tasks were then categorized into general activities each trade would perform in order to complete its respective scope of work on the project.

Step 2: Developing Job Hazard Analyses

Teams used trade expertise to develop Job Hazard Analyses (JHAs) for each of the tasks identified in Step 1. Using these trade-specific Best Known Methods (BKMs) as a basis for injury mitigation, the teams stressed alternate tools and methods.

For example: standard utility knives were virtually eliminated for project work. Instead, tools with no exposed blades were often substituted. Electricians, accustomed to using the razor-equipped utility knives for stripping insulation from wiring,

selected a variety of specialized stripping tools for specific gages and types or wire.

"We coach our trade contractors that getting rid of the hazard altogether is the best way to prevent injuries," says Blake Devine of Baugh Construction, one of Intel's construction manager/general contractors. "Sometimes they want to use PPE—such as Kevlar gloves—as the first step. We remind them that PPE should only be used as a last resort, when no safer alternative is available."

Step 3: Training the Foremen and Crews

JHAs have become the basis for safe work practices. The next step is ensuring that foremen and their crews understand them.

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Kinetics, a process mechanical contractor, bound each of its Job Hazard Analyses together in a pocket-sized field manual and

issued one to each of its craft employees. At each morning's coordination meeting, foremen led their crews through a rigorous task-planning exercise, using the JHA manual as a guide.

Mike Tietz, project manager for Kinetics, explains, "After a while, the new practice becomes habit. New employees joining the project also have a basis for understanding how we do business."

Step 4: Observing the Crews

Each team developed a means of observing how the crews were implementing the cut mitigation plans in the field. One project conducted random surveys of crafts, asking whether they were aware of the cut reduction efforts, and asked for examples of new practices learned. Another team trained general foremen and

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superintendents to conduct behavioral observations. Not only did this reinforce the positive conduct of crafts in the field, but it enhanced the skills and accountability of first-line managers for planning for the safe execution of work.

Step 5: Measuring Results

Teams were tasked with selecting metrics for measuring results of the mitigation efforts. Emphasis was placed on leading indicators to supplement traditional lagging indicators, so teams monitored the number of alternative means and methods selected, number of craft-generated Best Known Methods, and performance against plan for foremen and their crews.

In each case, cuts and hand injuries were virtually eliminated during the emphasis period. Some contractors, who had gone

through a similar exercise previously, have shown encouraging results. Rosendin Electric, Inc., an electrical contractor, has not suffered a hand cut due to wire stripping in more than 30 months and 450,000 manhours of work.

To date, we have seen a slight increase in hand injury recordables from our February low; however, we are confident that repeating the process will assist our construction sites in continuing toward the goal of eliminating hand injuries.

Step 6: Repeating the Process

The methodology is not innovative; it is, however, thorough. And it is well supported by Intel's longstanding commitment to continuous improvement of its own performance and that of its contractor colleagues. "The challenge now is for the construction community at Intel to repeat this process for the next injury type we need to eliminate," says Jason Ptacek, Intel project manager.

Intel's procurement group works to enhance the efforts, as well. On new projects, the Intel Contracts and Materials manager drives continuous improvement of contractor performance in a variety of areas, including safety. "When the procurement folks talk to our trade contractors about continuous improvement of safety performance, it really drives the message home," says Neil Simolke, Intel Tool Install project manager. "We rely on our EHS professionals to be coaches and technical experts, but we set the expectations ourselves. It makes a big difference in how it's perceived."

Next Steps

The commitment of Intel and its construction contractors continues to create a safer construction workplace. Recordable injury rates at Intel's sites worldwide range between about 0.50 and 1.80, averaging about 0.86 thus far in 2001. This performance helps influence construction safety in general in the communities where Intel is present.

Based on the analysis of our data, which we filter for the purposes of fatality prevention and elimination of injury, our next Pareto Item focus area will be the elimination of potential near-misses and hits of underground utilities. The entire process outlined above will be repeated for the elimination of these types of events, as well. Intel is committed to the continuous improvement process for several reasons: 1) reduced injury to workers, 2) higher job-site morale, 3) greater productivity and efficiency, and 4) lowered costs.

At a recent safety conference in Portland, Oregon, an EHS professional at a neighboring high-tech facility said Intel's efforts influenced safety on her site, too. Contractors that had recently worked on an Intel site, she said, typically brought innovative techniques that her company had not thought of. "I'll take a trade contractor from Intel any day," she said.

Intel hopes its efforts do just that: influence the way construction contractors do business outside of Intel.

It's just one more way the company can provide a great place to work. ■

Brett Phillips is Intel Corporation Northwest Regional Projects EHS Manager. Brad Burris is Corporate Intel Corporation Projects EHS Manager. Intel Projects EHS Managers are responsible for overseeing environmental, health, and safety issues for Intel construction projects worldwide. The responsibilities include ensuring that construction and future operation and maintenance of Intel sites are safe for human health and the environment. Intel Corporation is based in Santa Clara, Calif.

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