

The Evolution of Eye & Face Protection Products

DAVID PETERS IS CEO AND PRESIDENT OF SELLSTROM MANUFACTURING CO., A PERSONAL SAFETY EQUIPMENT MANUFACTURER IN PALATINE, IL.

In this interview, Peters explains how eye and face protection products have evolved over the years and offers guidelines for selecting properly tested and certified products that best meet workers' needs.



DAVID PETERS

became president in 1992. Sellstrom is a family-held company that my wife Judy's grandfather started in 1923.

MPS: *How has protective eyewear evolved over the past 10 years?*

DP: Over the last 10 years, eyewear has evolved in the following ways:

1) New concentration on specialized elements and niche markets (e.g., cleanroom, ballistic resistance, wild land fire, photochromatics, polarized lenses).

2) Continuation of fashion emphasis.

3) Development of special lens coatings for indoor/outdoor use, better anti-fog and better scratch resistance.

4) Designs for females in the workforce.

MPS: *Provide a brief description of your professional background and position as CEO and president of Sellstrom.*

DP: I hold a degree in marketing from Northern Illinois University. I started at Sellstrom in 1976 and held various jobs within the company until I

5) Temple comfort and fit advancements.

6) Elevated protection performance from hazardous impact elements.

MPS: *Over the past 20 years, spectacle lenses have changed from glass to polycarbonate. Are there any special environments where glass lenses are preferred over polycarbonates lenses?*

DP: Very few—advances in coating technology along with proper routine inspection of the spectacle have made polycarbonate the overwhelming choice. A polycarbonate substitute is even available for cobalt-blue lenses.

Atmospheres that are heavy with solvents or acids will, over time, attack polycarbonate. However, with a routine examination of the device, one can tell relatively easily if there is some degradation. If so, discard the spectacle. It should be noted that polycarbonate is far less expensive than a comparable glass lens and still offers more impact protection in a non-degraded state.

Some extreme heat applications may still require glass for the application, but that window is slowly closing with advancements in material compounds and advancements in reflective coatings.

MPS: *What types of lenses are preferred for non-plano (prescription) safety eyewear?*

DP: CR-39 lenses or glass lenses must be used for some extreme Rx situations, but polycarbonate has

made great strides in the single-vision and most common bifocal and trifocal situations. Remember, the objective is optics, clarity and protection. When polycarbonate can be used to achieve optics and clarity, its protection factor and weight make it the obvious choice.

MPS: *Welding helmets now come in different shades. How many shades are available, and how can an SH&E professional ensure that s/he selects the proper shading protection?*

DP: Arc welding, as opposed to gas welding, shades run from shade 9 thru 14. Glass and polycarbonate plates are available for most of the shades. The overwhelming standard for arc welding is shade 10. A lesser demand exists for shades 9, 11 and 12 with minimal demand for shade 13 and 14.

With the advent of auto-darkening filters, many models offer variable shades with one electronic filter. The welder can adjust the shade to meet the requirement of the job without the hassle of changing plates. The ANSI Z49.1 standard has published a selection chart, which recommends the proper shade filter for the specific type of welding procedure to be performed.

MPS: *With respect to nanoparticles and eye and face protection, do you believe current products are satisfactory or do you think changes will be made to address nanoparticle exposure to the eyes and face?*



Photo 1: Old helmet.

DP: There is always room for improvement in regard to PPE products, and with the growing knowledge in technological fields, we will continue to discover new methods of protecting users from fine particulates and other hazardous health risks.

MPS: Do you recommend spectacles or a full-face shield for laboratories or working environments with the potential of splash?

DP: Possibly both. Face shields, because of their design, cannot offer the degree of protection (from an impact point of view) as a spectacle or goggle.

Therefore, if there is any chance for an explosion, disintegration of a grinding wheel, or the possibility of any other fragment or high-speed projectile occurring in the process of using a face shield, a spectacle or goggle must be used in conjunction with the face shield. In working environments where splash hazards may exist, goggles with indirect venting may be a better product selection.

MPS: What are your suggestions and recommendations for SH&E professionals with regard to product selection and impact resistance? What should they look for when reviewing product options?

DP: SH&E professionals must first have a thorough understanding of the task at hand and be able to identify any potential hazards in the workplace. Without that knowledge, the employee may not be protected properly. The ANSI Z87.1 standard is a guide for product selections for the more com-

mon hazards that may be encountered.

Also, the safety pro must have a strong understanding of the product markings on the lens of the spectacle or goggle. Each lens must identify the manufacturer and lens type. Again, use the ANSI Z87.1 selection chart as a guide. The Z87.1-2010 standard incorporates many changes in the lens markings to help in selecting the proper lens for the application.

MPS: Some eye and face protection products made overseas may carry ANSI markings, but it can be difficult to determine if these products have passed the testing requirements in standards, such as Z87.1.

If SH&E professionals choose to use these products, what steps should they take to ensure that the products meet applicable testing requirements?

DP: The safety pro must identify the manufacturer and determine if:

- 1) the manufacturer is a “known” company;
- 2) the manufacturer is a domestic company;
- 3) the manufacturer conforms to current ISO 9001:2008 standards;
- 4) the manufacturer maintains a full quality control department capable of answering technical questions about testing and usage.

All major U.S.-based companies understand these requirements. When companies buy foreign products without proper prior testing, they take a huge risk. Anyone can mark anything on a product. However, if an injury or death occurs, will that company be able to provide the documented records that show proper testing has been conducted? Plus, do they carry the necessary liability protection for your company? Remember, cheap products always carry inherent risks.

MPS: The federal government still continues to recognize older

versions of the Z87.1 instead of the most current version. Has this caused any issues for Sellstrom as a safety eyewear manufacturer?

DP: On occasion, this presents a problem. However, most progressive companies are aware of the newest versions of the Z87.1 standards. They understand that even though an older standard may be acceptable, the faster they can transition to the newest standard, the better off they will be. A court of law may not care that OSHA “allows” products to an older standard if the newer version prescribes a protector for the same hazard that may provide a higher level of protection. The court may conclude that the employer has a duty to provide the employee with the best protection available; regardless of whether OSHA recognizes the new standard or not.

MPS: How does Sellstrom ensure that its products best meet workers’ needs? Does Sellstrom conduct independent research studies or surveys to determine what type of eye and face protection workers are most in need of?

DP: That is a moving target. While we conduct product research when we introduce new products, the market tells us through our sales whether or not we have designed our products correctly. We constantly review the feedback we receive from our distributors and their customers.



Photo 2: Quality control—high-velocity test.



Photo 3: Sellstrom production team.

Some new products are born from problems that occur with some of the newer manufacturing or process techniques.

Sellstrom works with customers independently to develop new specialized products through research studies and material advancements. These can be as simple as a change request in anti-fog properties or as advanced as new field requirements due to technological advancements, (i.e., firefighting, autoclaving, gamma radiation, etc.).

MPS: *Has Sellstrom ever needed to create eye or face protection to*

protect against injuries that were previously nonexistent or once rare in the workplace?

DP: Probably not create; however, we have tweaked a few existing products to fulfill a unique requirement for a special situation.

MPS: *How does Sellstrom test its products to ensure proper fit and level of protection?*

DP: We follow the requirements of most of the existing standards for eyewear throughout the world. We have our own lab on premises and have all of the equipment “certified for accuracy” at prescribed intervals. We are an ISO 9001:2008-certified company. We are constantly refining all of our systems and processes that go into making our testing and quality system credible.

MPS: *What are the components of Sellstrom’s quality management system?*

DP: The quality management system consists of processes that pursue customer satisfaction with the underlying goal of quality improvement in all phases of our operation—

marketing/sales, research/design, purchasing, manufacturing, quality control and logistics of products.

MPS: *How does Sellstrom ensure that it continually meets or maintains the requirements of ISO 9001:2008 certification?*

DP: We are audited by an ISO-certifying body twice a year. The requirements to maintain this certificate are defined and must be demonstrated to our auditor at any time. We do our own internal audits and issue recommendations to each department to ensure that we perform to a prescribed level. The new standard demands continuous improvement as well as measuring a degree of customer satisfaction with our entire process. Continuous training of our personnel and empowering them to build products conforming to applicable standards of performance are critical to our quality program’s success. ☺

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working shift work schedules impact the health of workers and the frequency of accidents, and how do the impacts differ for older workers and for women?

A common thread for all employees is the toll that shift work takes on them mentally and physically, leading to increased potentials for illnesses and for occupational injuries. According to Bird and Mirtorabi (2006), shift work contributes to the world’s worst industrial accidents and costs employers \$206 billion annually, including more than \$70 million for shift work-related accidents and \$15.9 billion for medical treatment.

Negative health effects for shift workers include increased incidence of cardiovascular and gastrointestinal illnesses, obesity, cancer and diabetes. Additionally, circadian rhythm adjustment and fatigue associated with shift work are reported to increase the accident and injury frequencies, both on night shifts and on day shifts.

Many of the adverse health and safety effects can be tied back to employee’s sleep and waking schedules being unsynchronized with their natural circadian rhythms, causing immediate and acute fatigue. Fatigue causes slower reaction times and loss of mental acuity and may con-

tribute to hypertension, diabetes and other ailments. With shift work an established element of modern work life, it is necessary for employers to look at ways that the effects can be mitigated. This may include adjusting the duration and direction of rotating shifts, the length of work shifts and the number of breaks incorporated, the balance of scheduled work shifts and time off and even work scheduling and illumination. Making an effort to minimize the adverse impacts of shift work may be seen as providing a safe place to work under the OSHA general duty clause. Additionally, Dembe (2009) predicts that “it would not be surprising to see an increasing number of claims for workers’ compensation benefits for cardiovascular diseases, cancer and other ailments that have been associated with long working hours.”

HEALTH EFFECTS OF SHIFT WORK

According to Roan (2008), “As much as 15% of human genes function on a schedule, with highly regulated, oscillating patterns of activity. These clocklike genes are common features of most cells and can be found in every major organ in the body. They, in turn, affect the schedule of scores of biological functions, from metabolism to cell division to cognitive processes.”

These oscillating patterns are known as circadian