

**REPORT**

**FACTORS THAT MOTIVATE  
OWNERS OF AUTO REFINISH SHOPS TO  
IMPLEMENT CHANGES**

**Submitted to:**

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**Factors That Motivate Owners of Auto  
Refinish Shops to Implement Changes**

This report summarizes safe work practices implemented by auto refinish shops participating in the Design for the Environment program Auto Refinish Pilot Project (DfE ARPP), as well as the factors that motivated shop owners to make these changes. The information in this report is based entirely on ERG's recent site visits to nine auto refinish shops in the Philadelphia area and to one shop in the Minneapolis area. Table 1, which starts on the following page, lists a series of safe work practices and other improvements implemented by these ten shops. For each improvement, the table indicates the primary factors that motivated shop owners to implement the change, as well as the obstacles that seem to prevent other shops from making similar changes. These factors, or "change mechanisms," and obstacles were communicated to ERG during site visits and subsequent follow-up conversations with shop owners. Table 1 is organized into the following three sections: the first section addresses shop improvements involving changes to equipment, such as sanders, spray guns, and spray booths; the second section addresses changes to personal protective equipment; and the third section addresses all other changes.

As Table 1 shows, improved work practices in auto refinish shops result from many different factors. However, the following factors appeared to play some role in most changes implemented at the selected auto refinish shops: regulatory requirements, production, cost effectiveness, worker safety, and the quality of completed paint jobs. As a result, ongoing efforts to encourage changes and improvements at auto refinish shops should consider at least these factors.

**Table 1**  
**Factors Motivating Shop Owners to Implement Safe Work Practices**

Shop Improvement	Motivating Factors for Implementing the Change	Obstacles for Implementing Change
<i>Changes to equipment in the auto refinish shop:</i>		
Using vacuum sanders instead of pneumatic sanders or manual sanding	The primary factor that motivated shop owners to purchase vacuum sanders is the perceived benefits associated with the reduced dust levels. These benefits include reduced worker exposures to dusts, reduced time spent sweeping dusts from shop floors, reduced time spent cleaning cars, and minimized chances that dust particles might settle on freshly painted cars. One owner indicated that his shop spent less money on sand paper since the painters began using vacuum sanders, but this finding could not be substantiated. Note, city of Philadelphia regulations require the use of wet sanding methods or vacuum sanders.	Several shop owners indicated that they would not purchase vacuum sanders until they were convinced that this tool was effective. Painters and shop owners that ERG interviewed mentioned that vacuum sanders tend to take longer to operate than other sanding techniques, that workers would rather not use a device with an extra hose attachment, and that vacuum systems at some shops have frequently malfunctioned.
Using high-volume, low-pressure (HVLP) spray guns instead of conventional spray guns	Several different factors appeared to motivate shop owners to purchase HVLP spray guns and painters to use them. These factors include regulatory requirements (for shops in Philadelphia), perceived cost savings associated with higher transfer efficiencies, reports that performance of HVLP guns is comparable to that of conventional guns, and reduced worker exposures to paint overspray. Since many shops use HVLP guns in areas where their use is not legally required, it seems that regulatory requirements alone are not a critical factor for implementing this change. Further, other motivating factors might include the use of HVLP guns becoming more widespread and accepted by the industry and paint distributors often recommending their use to painters, but shop owners did not cite these additional factors during ERG's site visits.	Though many of the painters that ERG interviewed own HVLP spray guns, not all of these painters use them, particularly for spraying clearcoats. Several painters indicated that HVLP spray guns were incapable of atomizing the more viscous clearcoat formulations to their satisfaction. Thus, the primary obstacle in getting shops to use HVLP spray guns seems to be a misconception that the guns cannot produce the type of quality clearcoat finish demanded by customers. Another obstacle may be that painters are unaware of how to adjust settings on HVLP spray guns to optimize their performance.

**Table 1 (Continued)**  
**Factors Motivating Shop Owners to Implement Safe Work Practices**

Shop Improvement	Motivating Factors for Implementing the Change	Obstacles for Implementing Change
Installing spray booths for painting operations	Owners of the auto refinish shops that ERG has visited to date almost unanimously indicated that they installed spray booths due to the recent shift from lacquer-based paints to polyurethane-based paints: (1) curing cycles in spray booths now allow shops to refinish many cars in one day; and (2) the quality of finishes is now reportedly better when paints are sprayed in booths with controlled air flow patterns that help prevent dust from settling on freshly coated surfaces. It is interesting to note that the shops visited to date all installed their spray booths before the city of Philadelphia required this equipment.	Although ERG has yet to visit a shop that does not have a spray booth, feedback from shop owners suggests that the high cost of purchasing and installing spray booths is probably the primary obstacle for making this improvement. This obstacle is greatest for the smaller auto refinish shops, which may not have the income to finance such an improvement or the incentive to do so, given their lower production levels.
Installing prep stations for painting operations	Two of the shops that ERG has visited to date had prep stations with downdraft ventilation systems, in which painters performed some sanding operations and applied primers and basecoats. The owners of these shops decided to install the prep stations primarily because shops could not maintain production demands if they performed priming and basecoat applications only in spray booths. A related factor that likely affected this change is the city of Philadelphia's regulations, which prohibit painters from spraying cars in the open shop space.	Painters at many of the shops that ERG has visited spray primers and basecoats in the open shop space. When asked if they would consider installing prep stations to reduce worker exposures, shop owners generally indicated that such improvements are expensive without an associated cost benefit. Some shop owners also indicated that they did not have enough shop space to accommodate a spray station.
Designing effective ventilation systems for paint mixing rooms	The primary factor motivating shop owners to install ventilation systems in paint mixing rooms is that the enhanced air flow minimizes the amount of solvent vapors in the mixing rooms, thereby reducing worker exposures.	The main obstacle to installing ventilation systems in paint mixing rooms is cost. Most shop owners seem to be aware that additional ventilation would improve working conditions in their paint mixing rooms, but they either cannot afford the expense or they believe the potential benefits do not justify the expense.

**Table 1 (Continued)**  
**Factors Motivating Shop Owners to Implement Safe Work Practices**

Shop Improvement	Motivating Factors for Implementing the Change	Obstacles for Implementing Change
Purchasing and using automated gun cleaners or parts washing sinks	The primary motivation for purchasing gun cleaning systems for shops in the Philadelphia area is that the city requires that shops have automated, enclosed gun cleaning systems that recycle the cleaning solvents. Every shop that ERG has visited to date had either an automated gun cleaner or a parts washing sink. Thus, some sort of gun cleaning equipment appeared to be standard among auto refinish shops. Consistent use of this equipment, however, varied among the shops. (See the “obstacles” for more discussion on this topic.)	At many shops, painters clean their spray guns manually, instead of using a gun cleaning device. The primary obstacle to using gun cleaners is the painters’ perception that manual cleaning is most effective at removing potentially-damaging paint particles from spray guns. Several high production shops noted that the solvent reservoirs in gun cleaning systems quickly become too contaminated with impurities to effectively clean spray guns. These shops indicated that residual impurities in the spray guns can ruin both paint finishes and the guns themselves.
Implementing onsite solvent recycling	Two of the shops that ERG has visited had distillation units that painters used to recycle solvents. The primary motivating factor for installing these units was cost: at both shops, the owners thought cost savings associated with reusing spent solvents outweighed the original investment of purchasing the distillation units and the ongoing costs of operating them.	Shop owners generally cited one of two obstacles for why they did not recycle solvents. First, owners of smaller shops did not think they would be able to recycle and reuse enough solvent to recover the costs of the initial purchase and the ongoing operation and maintenance of the stills. Second, owners of some larger shops indicated that their previous attempts at recycling solvents were largely unsuccessful, due to malfunctioning equipment.
<i>Changes to personal protective equipment (PPE):</i>		
Having workers use supplied-air respirators when spraying paints	The primary factor that seems to motivate shop owners and painters to use supplied-air respirators is that they offer much better respiratory protection than air-purifying respirators. In fact, paint manufacturers recommend and OSHA, in some cases, requires that painters use supplied-air systems. It should be noted that one of the shops where painters use supplied-air respirators indicated that this form of protection may cost less than air-purifying respirators, because supplied-air respirators eliminate the need to purchase replacement filters.	The primary obstacle to this improvement is that painters tend to find using supplied-air respirators inconvenient and uncomfortable: they do not like carrying the supplied-air hose with them during paint jobs, they find it cumbersome to don and doff the supplied-air equipment every time they enter the spray booth, they do not like facepieces that restrict their peripheral visions, and they do not like hoses hanging from the front of their facepiece. Another obstacle is that some shop owners do not attempt to challenge the painters’ perception of inconvenience by testing different forms of respiratory protection.

**Table 1 (Continued)**  
**Factors Motivating Shop Owners to Implement Safe Work Practices**

Shop Improvement	Motivating Factors for Implementing the Change	Obstacles for Implementing Change
Ensuring that workers consistently wear their respirators, as needed	Some auto refinish shops placed a greater emphasis on their painters' consistent use of respiratory protection than others. The primary factor motivating shop owners to encourage their workers to use PPE appeared to be both a genuine concern for the health of the painters and a fear of fines that might result from an inspection by OSHA. (The two shops with the most comprehensive respiratory protection programs were the only shops that ERG visited that had been inspected by OSHA.)	The main obstacles associated with consistent use of respiratory protection are primarily a lack of dedication from management to enforce shop policies on PPE and a lack of motivation among painters to wear appropriate PPE while working with paints. Note, several shop owners indicated that good painters are hard to come by, thus, shop owners are often reluctant to force painters to wear PPE because they do not want the painters to quit.
<i>Other changes and improvements:</i>		
Implementing effective health and safety management practices (e.g., training, conducting routine inspections, following hazard communication procedures, and so on)	Of the shops that ERG visited, owners cited several different factors that motivated them to implement effective health and safety management practices, such as employee training, conducting routine shop inspections, and hiring consulting services to develop respiratory protection and hazard communication programs. These factors include, but are not limited to, a genuine concern for the health and safety of painters, the potential costs associated with workers who get sick on the job, fear of fines that may result from OSHA inspections, compensation provided by insurance carriers for implementing effective safety and health programs, and the desire to retain good painters by providing a clean and safe work environment.	ERG noted two major obstacles that auto refinish shops face in implementing effective health and safety procedures. The first obstacle is cost: shop owners indicated that they would need to designate a full-time employee to effectively manage environmental and safety and health issues; however, most shops cannot afford to have such specialized staff. The second obstacle is a concern about production levels: some shop owners feel that health and safety practices slow workers down, thus, limiting their productivity.