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Presentation Paper: FABTECH 2015

Topic Title:
Spray Booth Design; Do it Right!
Spray Booth Essentials – Designing the Perfect Booth
Optimizing your spray environment while minimizing your cost

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Introduction:
Today, manufacturers, or part Finishers, must discover ways to avoid costly mistakes and design the correct spray booth that's fits their paint finishing requirements. Too many times companies assume a design concept of their booth, and move too quickly into ordering rather than designing – this is costly, in time and money, from installation to operations.

The "Perfect Booth" must address the Three Essentials of a spray booth solution...

- Protecting employees and facilities at all times from a hazardous environment
- Providing a spray environment in which to obtain the highest quality finish
- Realizing and sustaining measurable cost reductions and optimizations from spray booth operations.

In this 3-Part presentation, titled ***Spray Booth Essentials – Designing the Perfect Booth***, we embrace the ultimate spray booth design objectives, and applies them to specific spray environments both liquid and powder. To achieve the Three Essentials above, care and planning must be performed by both the Finisher and the spray booth designer prior to the booth's design, during installation and booth operation.

Part I: How to Design the *Perfect Spray Booth*...
5 Critical Design Objectives and How They Relate to Key Manufacturing Fundamentals

To start, Finishers must understand their manufacturing fundamentals that are critical to be addressed in any booth designed for them – the parts the Finisher manufactures, along with the coatings applied, the production volume and rate, the ultimate booth location, and safety and code requirements.

By considering these manufacturing fundamentals, the Finisher must achieve these ***5 Spray Booth Design Objectives*** to deliver their Perfect Spray Booth

1. The right spray booth size to be efficient,
2. The right spray booth design to effectively facilitate production output,
3. The right spray booth equipment to enhance spray quality and finish,
4. The right spray booth that completely complies with all safety code standards,
5. The right spray booth that allows you to produce parts, cost-effectively.

Taking each one of these ***5 Spray Booth Design Objectives*** individually, the questions that must be asked and answered by the Finisher are critical to the booth solution that is designed and installed. Although these may appear to be basic and fundamental, too many Finishers and booth designers ignore one or all of these questions and the outcome is far less than what was originally desired.

Question #1: What type and size of part is designed, manufactured and delivered by the Finisher?
The key here is to understand that not all parts can be treated the same way in a spray booth design solution. Here are a few aspects about the part to consider in engineering the proper, inside working dimensions of the spray booth...

- **Current part size** (from all dimensions) must be evaluated and discussed to help arrive at the effective size of the booth needed. Although small parts deserve smaller booth dimensions (and larger parts deserve larger) consideration must be given to the access needed around the part, spray clearances, door clearances, and more.

  If a spray booth is designed too large, the Finisher risks losing the cost effectiveness in booth operation, which is one of the key Essentials. Conversely, if too small, the guarding of air flow is lost where the Finisher risks not only the quality of finish, but the quality of the spray environment, from operator safety and health, to the outside plant environment.

- **Future part size** of production parts could influence in size and dimension of the spray booth as the Finishers considers the initial design. Finisher must also anticipate plans for future parts that may be manufactured and coated within the proposed spray booth. Not only from a size perspective, but also anticipating any changes in production rates as well. By anticipating future part needs, the Finisher can extend the life of their booth.

- **Configuration of the part** will determine how the spray booth operates to facilitate the Finisher's spraying operation...
  - Vertical vs horizontal orientation will determine proper height, width and length of the booth to ensure ample room for spray operations;
  - One-sided vs 2-sided part orientation determines the need for proper width and depth of the booth to accommodate spraying equipment;
  - Single sprayer vs. multiple sprayer operation will sometimes determine the width and height of the booth for air quality and safety; this is especially true for powder applications when multiple operators or gun stations are employed.

As you can see, the above part size and configuration (along with other considerations discussed below) will determine the size and shape of the booth.

Question #2: What types of coatings are involved in the process for finishing the part?
Not all coatings are controlled the same way within a spray booth. Taking the specific coating into consideration, upfront in the design, is essential to delivering the correct spray environment.

- **Functional liquid coatings** require a spray environment capable of providing for a basic finish quality. Examples include coatings such as primers, mold releases, rust inhibitors, and scratch and mar coatings. These coatings sometimes require minimum filtration without a sizable emphasis on air supply quality and air flow design. By nature, liquid spray booths that address these types of coatings are basic in design and function.
- **Aesthetic liquid coatings** require a high finish quality. Examples of these high finish coatings include top coats, color coats, clear coats and specialty finishes (hammertones, speckle, wet-on-wet...). The spray booth design choices now become more critical – such as air flow, filtered supply, temperature controls, and more. The booth designed for these types of coatings must address key operating equipment of the spray booth to be in concert with the coating applied. Spray booth designers need to bring system solutions to the Finisher during the design process to ensure the coatings are effectively controlled in the spray booth.

- **Powder Coating Application**s where powder booths can be designed for either reclaim or spray-to-waste. The booth must be designed to accommodate the spray objectives of the booth. Long runs with the same color don't' require as many color changes, whereas short color runs require multiple color changes. When many colors are used in small quantities, spray-to-waste systems should be considered. Sometimes with short color runs are needed, and consistently used in high production runs, multiple booths can be used for optimal efficiency and to eliminate color changeovers. A reclaim cartridge-style booth is typical for long color runs.

- **Dual-Purpose Booths/Multiple coatings** that are applied within the same spray environment must be considered as well. Does the booth serve two purposes, such as applying functional coatings as well as applying top coat finishes? If so, designing the booth's operation to the highest common denominator (e.g. top coat finishes) allows for all coatings to be effectively controlled. A combo liquid-powder booth, if designed properly, can also be considered.

- **Method for the coating application** will also influence the ultimate design of the spray booth solution. If it's a manual application booth, then designer must consider the proper air flow operator safety and finish quality. If it's an automatic application, then typically there is a higher volume of paint overspray that must be controlled and filtered, with less regard for operator safety. And electrostatic applications, such as powder, inherently offer higher transfer efficiencies, and thus require lower air flow rates.

Ensuring that the spray booth designer understands and discusses the types of coatings to be applied in the spray booth with the part Finisher is vital to determining not only the correct spray booth size, but also ensuring that all appreciate the type and sophistication of the required spray booth equipment.

Question #3: What are the Finisher's production requirements?
Production requirements vary widely and require booth design solutions that can meet these production rates. Of particular concern is the specific rate of production such as (parts/hour, parts/day). This information is vital in assessing the booth's filtration and airflow options. In addition, there are two basic production methods used in a spray finishing operation; batch systems and automated systems. Let's look at both of these as they apply to spray booth designs.

- **Batch Systems** are the most common and incorporate basic booth designs. A batch finishing system design is best described as part(s) that are loaded into the booth's working area, manually – whether it is a single part (large or small) or many parts loaded on a cart or part holders. Batch systems can use several airflow types, but typically use either an open face (a booth enclosure without doors) or closed-booth design (with doors built in). Also, booths which are designed to accommodate a batch system method have lower painting production rates, so the booth faces less overspray to filter.

- **Conveyorized Production Systems** are associated with higher production rates, and use some form of conveying the parts through the booth. Conveyor systems can run parts continuously through the booth, or index parts into the booth at some load/unload rate. Specifically, an overhead conveyor system with small to medium size parts can introduce parts into a spray booth at very high rates. Subsequently, the booth must be designed to handle this kind of heavy paint/powder overspray loading.

By definition, for both Batch and Conveyorized systems, the paint or powder that is atomized and sprayed at the part that *does not* adhere to the part surface is called "overspray". Spray booths must be able to process and filter this paint overspray that is generated into the work area of the booth. Knowing the production rates required in a booth design is vital to the booth designer to incorporate the best airflow and exhaust filter design to process this paint overspray.

Question #4: Where will the spray booth be located?

Location matters in the design and function of your booth, and influences all design aspects for the spray booth solution as well – this cannot be underestimated. Since booth operation is typically determined to operate inside the plant to better facilitate production, the use of the plant floor space is critical and must be given consideration to optimize this space in order to maximize profit per square foot.

These considerations include required space availability for the booth operation as well as building interferences, such as building columns, other building support steel, roof height/trusses, and ample access to booth for maintenance.

Matching your booth design to the chosen location is critical. This location if not chosen correctly can compromise the booth design because of any building limitations. These compromises should be identified and discussed as the location is being chosen and during the design process. From dry filter, water wash, to powder booth solutions, all have unique requirements where the booth location must be considered in order to perfect its operation.

Sometimes liquid booths are determined to best operate outside of the plant, so other considerations may arise. Ground locations, proximity to adjacent buildings, access to utilities such as compressed air, gas and electrical. In addition, other booth features and requirements such as the need to insulate the booth due to cold weather climates or snow loads. Structural requirements to meet local codes and/or seismic conditions must also be reviewed.

Question #5: Will the spray booth meet all safety standards, yours and those of the regulatory agencies? Booths are highly regulated by many different agencies, as well as any other regulations that the Finisher requires within their plant – the spray environment impacts directly on operator health, personnel and plant safety, productivity, potential fire hazard, along with an overall environmental impact. Because of these important aspects, spray booths are highly scrutinized by the applicable governing agencies.

A typical spray booth installation is much like a mini-building construction project. Not only is there the mechanical installation of the booth, but also the building interface and utility connections to the booth. Whether a small bench booth, large equipment down draft booth, or powder booth, they all require utility connections, such as wet sprinkler lines, electrical connection to building electrical sources and compressed air from a compressed air source. In addition to utility connections from building sources to the booth, there are mechanical interfaces with the building like roof openings, roof curbs, grounding requirements – and sometimes building space and distance minimums depending on booth location.

All of these utility and building interface necessities will require building permits from the local City or municipality, and sometimes third party certification such as U.L or ETL approvals. In addition, there are local and State air pollution permits for the VOC emissions that must be considered. As you can see, booths are highly regulated and the process is unavoidable and require compliance. It can be very costly and disruptive to underestimate these compliances in the final spray booth solution.

Employee safety is addressed by OSHA under section CFR-1910. These OSHA requirements not only cover personnel and operator safety but also address special guidelines for the operator which directly affect the design of the spray booth. Items such as emergency egress, proper airflow, storage of paint, minimum clearances are all items addressed in this code.

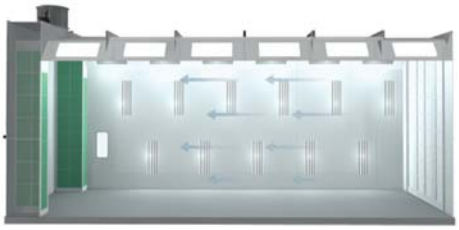
Lastly, there is plant and property safety which is governed by national and local Fire Department regulations, Finisher's need to protect product inventory and the cost to replace, to equipment downtime due to damage or citations issued by the regulatory agencies.

Bottom Line: The safer the work environment the more productive the workforce becomes while also reducing risk – sustainable productivity improvement is key.

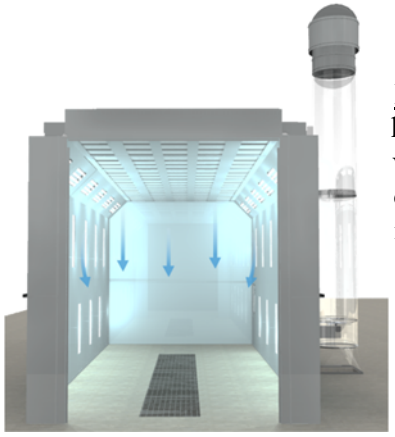
Part II: How to Design the Perfect Spray Booth...
Applying Booth Design Options to the Needs of the Operation

Secondly, after understanding the key manufacturing fundamentals for the Finisher, the various Spray Booth Solution options can now be evaluated to best fit those finishing requirements. Options are varied, and in order to choose the right spray booth solution you must consider the following: the right air flow design, the right booth insert design, either water wash vs. dry filter design, and the optional recirculating booth designs – all must match the production outcomes sought by both the Finisher and the spray booth designer.

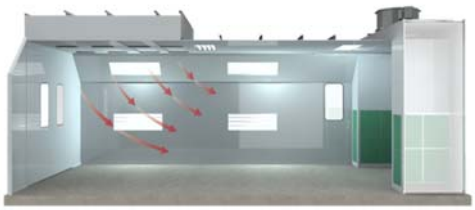
The following booth types solve the key production requirements necessary to ensure they meet the ***5 Key Design Objectives*** confirmed earlier (optimizing the size, facilitating production flow, enhancing spray quality, ensuring regulatory compliance, and consistently reducing the cost of booth operations) ...



Crossdraft Spray Booth, which is a booth best for parts that require a basic finish quality. These booths can be designed to handle a wide variety of parts and for all different sizes. The term "crossdraft" refers to how the air travels through the booth, in this case, horizontally along the "cross section" of the booth. It can be defined as a booth where air passes from the front of the booth (sometimes through supply filters) and then horizontally towards the booth's rear exhaust chamber. This horizontal flow causes air to flow uniformly over the painted part as it enters an exhaust filter chamber. The exhaust chamber incorporates the exhaust filters so the air can be filtered from any paint overspray as it passes through the filters. The clean air is pulled by the exhaust fan through these filters and exhaust duct system as it is discharged cleanly into the atmosphere.

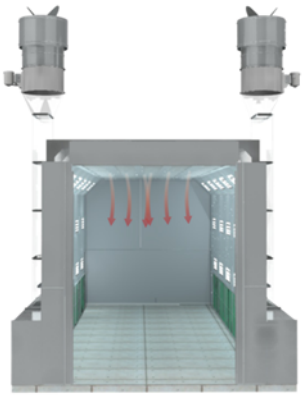


Downdraft Spray Booth, which is a booth best for parts that require a high finish quality. These booths can also be designed to handle a wide variety of parts of all sizes. The term "downdraft" also refers to the direction of air travel in the booth, in this case, in a downward movement from the ceiling down towards the floor of the booth. It can be defined as a booth where supply air enters top supply plenum where supply filters are located in the ceiling and then passes over the part as it moves towards floor of booth. Overspray is directed to the grating that is over a pit in the floor and then through exhaust filters, typically located right beneath the grating. The overspray passes through the filters and is removed from the air stream as it is drawn by the exhaust fan and ductwork system to discharge cleanly into the atmosphere.

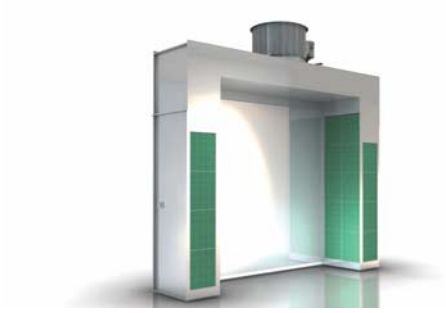


Semi-downdraft Spray Booth, combines the two airflows described above (crossdraft and downdraft). This style of booth is associated with higher quality finish requirements. The Semi-downdraft airflow design uses both the principle of a downdraft along with a cross draft design. Air is introduced in a ceiling supply plenum typically located at the front of the booth. The air then moves down and back towards the rear exhaust plenum which is at the opposite end of the booth and located closer to the floor. The air has a "Semi-Downdraft" movement and passes over the part in a downward and then horizontal movement as it approaches the rear exhaust plenum. The exhaust chamber is similar to the cross draft type and incorporates the exhaust filters so the air can be filtered from any paint overspray as it passes through the filters. The clean air is pulled by the exhaust fan through these filters and exhaust duct system as it is discharged to the atmosphere.

Modified Downdraft Spray Booth, is also used for high quality finishes. They are many times used in large equipment applications where there are multiple spraying operations. Just like the downdraft booth design, the term "modified downdraft" also refers to the direction of air travel in the booth, in this case, in a downward movement from the ceiling down towards the floor of the booth.



It can be defined as a booth where supply air enters the top supply plenum where supply filters are located in the ceiling, and then passes over the part as it moves towards the floor of booth. The airflow is "modified" as the exhaust filters and plenums are located along the length of the booth near the floor which are called side plenums. This type of booth is sometimes referred to as a "Side Downdraft" style, which, unlike a Downdraft booth that requires a pit in the floor with grading, this modified airflow still allows the air to travel from the ceiling of the booth over the part and then towards the floor, but is diverted to these side exhaust plenums. This airflow design causes the air to move towards the bottom sides of the booth as it is directed to the exhaust filters. As the overspray is directed to these side plenums, the overspray passes through the filters and is removed from the air stream as it is drawn by the exhaust fan and ductwork system to discharge cleanly into the atmosphere.



Exhaust Chambers, rather than those booths described above**,** exhaust chambers are often used to create a "spray room" where the building becomes the spray zone or booth. Exhaust chambers are designed to efficiently remove the overspray from the painting operation, and when properly used, can provide uniform airflow throughout the work area. These Chambers are ideal for converting an area within your factory for spray painting, and can also be used to create a preparation area for sanding or cleaning parts prior to finishing.

Use caution when considering an exhaust chamber since there is not a "working depth" associated with these Chambers, which leaves the "spray area", undefined. It is important to review the details of the plant and where the chamber will be located as there are important code requirements – such as separation from other work areas and special electrical requirements. All electrical devices within such rooms are normally required to meet the requirements for Class I, Div. I area (e.g. Explosion proof).

Supply Chambers are also used to create "spray areas" for paint finishing operations. The Supply Chamber introduces fresh air into the paint finishing room to make up the air that is exhausted from the These chambers can be designed in many different configurations and sizes that can be incorporated into the building environment. The CFM capacity of the supply chamber should closely match the exhaust of the spray booth(s). Supply chambers can be placed adjacent to a building wall or can be suspended from the building to save floor space.

A note about Water Wash Booths: Finishers need to understand the unique differences between *Dry Filter Booths* and *Water Wash Booths*, where and when to consider them. All the above spray booth designs can be configured in water wash or dry filter designs. As mentioned above, the overspray that is drawn into the exhaust plenum is filtered before it is pulled through the exhaust fan and duct, and then discharged cleanly to the atmosphere. The filter system does all the work in separating the overspray from the air in dry filter booths.

Water Wash booths on the other hand use water as a filtration medium instead of the dry filters. The overspray is collected and trapped in the water curtain or scrubber section of the washer and then is dropped down into a collection tank. The collection tank eventually becomes filled with paint sludge and then needs to be cleaned. Many times a centrifuge or some other type of sludge removal system – a critical issue for high production finishers – is designed into the water wash booth system to remove the paint sludge on a continuous basis. This is much more common nowadays because of more stringent regulations on draining the process water with sludge. As said, these Water wash booths are usually used for very high paint volumes, where you also need uniform and consistent airflow. They also can sometimes lower operating costs because there is no filter expense in Water Wash booths and the need for labor to change filters on a continual basis.

A note about Recirculating Spray Booths: The key issue for Finishers and spray booth designers to consider is whether a 100% exhaust removal is required or can an 80/20% Recirculating booth be used. By definition, a 100% exhaust design does have its inherent inefficiencies when dealing with larger volumes of air as required in booths that must accommodate VOC abatement or temperature/humidity control.

Where this accommodation applies, the principle of recirculating the air is simple: recirculate 80% of the air through the exhaust plenum's 3-4 stage filter system, and reintroduce this particulate-free, clean air back into the booth's atmosphere as supply air. In this case, in addition to the recirculation air, 20% fresh air is introduced into the booth and is exhausted at the same rate.

The idea of supplying and exhausting 20% of the booth's air volume is based upon keeping the atmosphere inside the booth at a safe level, or 25% of the LEL (lower explosive limit). By only conditioning the fresh air at 20%, the initial capital equipment costs are greatly reduced as well as on-going operating costs. Theoretically, the equipment and operating costs are reduced by 80%. To put it in perspective, for example, if equipment needed to treat 40,000 CFM at 100% exhaust air, then a recirculating booth design conditioning only 20% of this volume equates to only 8,000 CFM.

Cautions when considering this recirculation solution:

- Finisher must have LEL monitoring to ensure that 25% of the LEL is maintained inside the booth to protect the operator, property and equipment;
- Operators who still use Personal Protection Equipment (PPE) can still be "exposed" to higher LEL levels;
- Operators must maintain and monitor the 3 or 4 stage filtration system to ensure proper air flow;
- Operators must understand and manage the cost of the "3-stage filter change-out" due to the air constantly recirculating through the 3-stage filter system

The bottom line in regards to recirculating booths, if designed properly, all of the concerns above can be responsibly addressed while benefitting from the greatly reduced equipment and operating costs.

A note about Powder Booth Design: Powder booths must address the same or similar key essentials for a proper booth design and solution:

- Protecting employees and facilities at all times from a hazardous environment
- Providing a spray environment in which to obtain the highest quality finish
- Enhance application efficiency
- Contain over sprayed powder
- Recover over sprayed powder

Airflow is calculated differently than liquid paint booths. Instead of the air velocity traveling at 100 FPM in the direction of airflow in the booth, powder booths are design to contain the powder in the booth and thus requires anywhere from 80 to 150 FPM through any openings in the booth enclosure. This velocity ensures that the powder is contained in the booth. Factors that affect this design velocity include:

- Part & operator opening sizes
- Volume of powder sprayed
- Part temperature
- Plant air conditions
- Environmental room conditions
- Recovery method
- Color change tools to be used

Another aspect of Powder booths and how they differ from liquid paint booths is the type of filtration that is used to collect or "reclaim" the powder. There are basically three forms of powder collection systems:

- 3-Stage Filters Systems
- Cartridge Module Systems
- Cyclone Systems

3-Stage Filter Systems: use 2 or 3-stage filter media (similar to a dry filter liquid coating booth) to capture the powder overspray. The powder is collected in the filters and then eventually discarded. This type of filter system is associated with low powder usage (10-25 lbs. of powder per day) and although is less expensive than the other cartridge collector systems, can be relatively expensive to operate because of having to continually change filters and also has the limitation of only being used for spray-to-waste applications.

Cartridge Module Systems: use one or more cartridge style powder collectors to capture the powder overspray. The powder is collected in the cartridge filter section that is attached directly to the spray booth enclosure. The powder collects on the round cartridge filters and is then "pulsed" off the filters into either a collection tray or fluidized bed system for recovery. Cartridge collector modules can handle much more powder than 3-stage filter type booths and are especially good for single color booths. They also have the advantage of reclaiming the captured powder and color changing capabilities if there are only a few colors.

Cyclone Systems: are good for multiple colors with a high frequency of color changes. They use a cyclone/separator to collect the powder along with a cartridge module for secondary filtration. These are high volume booths for high production rates.

Part III: How to Design the Perfect Spray Booth ...
Avoiding Costly Mistakes by Avoiding Risky Assumptions

As a brief recap, you learned that "who you are, what parts you manufacture, and how you produce them" is a critical conversation to hold between the Finisher and spray booth designer in order to effectively begin designing the perfect spray booth. And the importance of understanding the various booth design options and possibilities that should be considered to solve the spray environment challenges discussed in this paper.

What gets in the way of a spray booth that effectively performs properly, versus one that disappoints, are costly assumptions being made by the Finisher, and accepted by the spray booth designer – what we have defined as the ***Top 5 Costly Assumptions***. The result: Overlooked, underestimated design details in the booth design and installation that caused costly mistakes, and which could have been avoided, altogether.

Unfortunately, too many companies assume too much and anticipate too little, and their booth outcomes become a much bigger problem, rather than a problem-free solution as they had first hoped. Again, the ***5 Spray Booth Design Objectives*** must all be addressed, satisfied and validated at every stage of the booth design process.

Below, let's count down the ***Top 5 Costly Assumptions***, heard from Spray Systems customers over the years, and that are commonly overlooked and underestimated and that have caused costly mistakes as a result...

- **Costly Assumption Number 5:**

  "Any air flow design I choose will work for my booth and my part ..."

  No, this is a risky assumption. You must ask, is the airflow really capable of providing a quality spray environment, cost efficiently? If not, overspray won't be carried away, effectively. And for powder booths, although air flow is designed differently, this same air flow consideration must be addressed to capture powder overspray correctly.

  Critical booth design questions then arise: Are fan operations effective for design and configuration of the booth (downdraft vs crossdraft...)? How does the AMU and the supply exhaust work together to deliver the air quality needed? What should I expect from a new filter? Why do I have to change my filters so often/how can I optimize my filters? What filters should I avoid? How do I read the filter gage (manometer)?

  Symptoms quickly emerge by assuming too much – like overspray not being contained within the booth, people working outside the booth complaining about booth operations, and/or over-paying for filters, and more.

- **Costly Assumption Number 4:**

  "I should have enough lighting for my sprayer to see…"

  Another risky assumption. Paint finish quality is determined by the part clarity within the work operation of the booth for the painter.

  Critical booth design questions then arise: What is your true lighting requirement? Are there dark areas and shadows that will cause quality control and safety issues? Can the painter be assured of a consistent lighting environment? Should observation windows be considered (for visibility, safety, and for operator to be franchised into the manufacturing process?

  Bottom line: you can't paint well what you can't see well. For visibility, safety and for operator to be franchised into the manufacturing process.

- **Costly Assumption Number 3:**

  ""No worries, my building has enough air, so I won't need that air make-up system…"

  Costly assumption for liquid booth design. Not designing adequate make-up air can lead to many costly problems.

  Critical booth design questions then arise: Where does the air come from that supplies the booth's exhaust? What is needed to maintain effective temperature control in the booth when considering the conditioned or heated air make-up which depends on outside air conditions? Is there a negative building pressure environment which might cause improper air flow in the booth?

  Air make-up systems are typically overlooked and often not considered, fully, when first designing the booth: this underestimation will lead to costly mistakes. This is why powder booth design is attractive for Finishers because air supply is not required; therefore, equipment cost is minimized.

Costly Assumption Number 2:

"Although I've got the building inspector all over me, I'm sure my booth designer will meet all of the requirements..."

Dangerous assumption. This is an important conversation to have with your spray booth designer with action items addressed to be met to ensure compliance.

Critical booth design questions then arise: Does your booth meet personnel safety codes (OSHA)? Will your booth meet the various environment emission requirements (air pollution permitting and code compliance)? Will your booth meet all the fire requirements (booth and installation meeting all fire codes)? Will your booth meet all building and electrical code requirements (Building Department permits)?

Underestimating any of these – not knowing the codes before you locate and design your booth – will cause a disruption and delay in the installation and operation of your booth. The key is not only personnel safety and environmental safety, but booth productivity as well.

- **Costly Assumption Number 1:**

  "I think running the duct over here will work just fine ... "

  One of the most fundamental errors and assumptions made by many Finishers and spray booth designers alike – underestimating the design required for the exhaust and supply ducts to maintain correct air flows and minimize duct static pressure. When these duct static pressures are not properly accounted for, the booth air flow is comprised which results in poor air flow within the booth, and causing overspray containment problems. Too many times, when these symptoms occur, the Finishers look to something else that may be causing this environmental issue, when in fact, it was the poor duct design that was the primary problem.

  Critical booth design questions then arise: How can the exhaust and supply ducts be routed using minimal offsets and elbows (required to miss building interferences)? Can an adjacent wall be used rather than the roof line to minimize these offsets? Do you know and are you following the stringent fire code requirements for these ducts? Have you overlooked other key issues, like roof openings, clearances from other fresh air intakes, and weight of ducts and fans for support requirements?

  Bottom line: An improper duct design leads to poor booth performance, from poor air flow to increased sound levels from fans which creates a noisy booth environment affecting operators in the booth.

Spray booths are operating much smarter these days…
It's just not mechanical engineering for booth designs, and avoiding these costly assumptions, to be considered; but now, Finishers and spray booth designers must embrace computer technology that supports booth operation. This technology introduces a Spray Booth Interface within the Building Management System, or "BMS". Briefly, a BMS is described as a targeted software that monitors building operations, and keeps data logging and performance measurement trends for continuous process improvement for operating a facility, cost-efficiently. This has elevated the world of spray booth engineering to a new level of operation sophistication and Finisher expectation.

If everything is taken into consideration, the booth must maximize the Finisher's production opportunity. Through this technology, it will think for itself – from auto balancing booth atmosphere to actually monitoring booth parameters as part of a BMS. For example, booths can now notify the paint production managers through their iPhone, such as notifying managers when exhaust filters need to be changed or if something more serious is going on within the booth. All must be considered when designing the spray booth solution.

In summary, it's the Part Finisher's job to provide the right information about their part, the right information about their facility, the right information about their production requirements and expectations, and make no assumptions, all along the guidelines outlined in this Presentation. And it's the spray booth designer's job to take that information, give feedback on design options, and optimize its spray booth solution in both the mechanical design and technical sophistication.

About the Speaker:
Bob Hauck, Vice President for Spray Systems, Inc., with 40 years of technical experience in the finishing industry. Starting as engineer for Binks-Sames Corporation, he helped design large finishing systems for such OEMs as General Motors and Ford. Then promoted to West Coast Regional Manager for Binks, directing 3 west coast branches, with a business development force of over 20, advising customers, engineers and plant managers on designing effective finishing systems. Now with Spray Systems as Vice President, Bob leads the national business development team to design critical spray booth solutions for manufacturers in the aerospace and large equipment industries.