R&D and the Optics Manufacturing Shop Floor

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Abstract: Historically, the research and development department and the optical manufacturing shop floor have been independent entities. Optimax has been able to integrate the two departments for faster deployment and practical utilization.

1. Traditional R&D

To better underestand the need for integration between R&D and the Optics Manufacturing Shop Floor, let us look at the traditional R&D Department and its relationship with the Optics Manufacturing Shop Floor.

Traditionally, R&D has been physically, financially, and organizationally kept separate from the all other departments. A majority of the activities were focused on creating the next major breakthrough or revolutionary process that would change the industry. The prioritization of these activities would be handled by upper management and a budget would be assigned. Research and development would be performed separate from manufacturing and in many cases separate facilities. The separation of manufacturing and R&D would cause a disconnect and would hinder deployment. [1]

The relationship between R&D and the Optics Manufacturing Shop Floor tended to be an "over the wall" type mentality. R&D would create a process or technology in a vacuum and then push it down to manufacturing. The problem was that the deployment was slow and with out the input of the Opticians, there were times when it was not a practical solution in a production environment. The lack of communication between the two areas cost money and time, which in the business world can never be recovered.

2. R&D and the Optics Manufacturing Shop Floor at Optimax

Optimax's solution to this issue was to involve the Optics Manufufacturing Shop Floor in the R&D process. Whether it was the intial start up meeting or the actual experimentation, there was always a representative for the shop floor present and involved. The Optician's also have input when it comes to the design of the experiments. Many of the projects that have been worked on by R&D have resulted from real time issues that have been escalated by Optician's on the shop floor and because of this; they have a vested interest in the outcome. All experimentaion and data collection are performed by Opticians. All tasks are performed on the Manufacturing Shop Floor and not in a separate area. The experiments themselves are visible to everyone and information is shared by all.

3. Example Experiments

One example of this process was a conventional polishing study conducted with infrared zinc sulfide with the goal of producing defect-free polished surfaces in predictable amounts of time. From this study, it was determined that there was a strong dependence for both removal and surface roughness on the chemistry of the polishing slurry. Results indicated that the relationship between the ZnS surface, the abrassive and the pitch lap material are all very important in controlling removal rates. Using this information incorporated with future testing, the goal is to develop a standardized finishing process for ZnS to be used by the shop floor. [2]

Another example of a project that Optimax is working on focuses on increasing UV transmission by improving the manufacturing processes for FS. This particicular project is broken up into 4 phases. We recently completed phase 2, the polishing portion of the project and are currently working on the cleaning phase. For all 4 phases, the ultimate goal is to determine the optimum process to ensure the highest transmission possible for fused silica at UV wavelengths. [3]

4. Conclusion and Future Work

As a result of this collaboration, Optimax has been able to spread knowledge across all levels of the organization. R&D spends a good majority of there time working on practical solutions for real time problems. In addition, the rate of deployement is much faster due to the open communication between both R&D and the shop floor. Moving forward, Optimax is presently working on a joint R&D and production project that will ensure repeatable high quality surfaces on CaF2.

5. References

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