

With Retort Room Automation, Packagers Lower Labor Costs and Increase Throughput

By Eric C. Hanrahan, Director of Project Engineering, Allpax Products, Inc.

The process of loading and unloading a retort remains one of the most labor intensive on a modern packaging line. Hardware and software developments along with a vision for integrating the various steps in the process make this an ideal time for re-engineering the retort room. Automation helps packagers lower labor costs and increase throughput.

An intense amount of direct labor is required in the retort room, including:

- Loading retort baskets
- Conveying the baskets to the retort
- Loading and unloading the retort
- Unloading the baskets

The size of the retort baskets has classically been kept relatively small to ensure worker safety as the baskets are handled. As a consequence, retorts have traditionally been sized for smaller loads. In effect, the retort room and the retort itself are configured for small batch operations supported by manual labor. The process lends itself to repetitive motion and other potential lost-time injuries.

Reconfiguring the process

The key to successfully automating the retort room and meeting return on investment (ROI) objectives is to re-engineer the process for increased throughput and ease of operation. This entails planning for an increase in the size of baskets and retort, along with automating the loading, unloading, and conveying processes. While every facility has its unique characteristics, Allpax

Retort Room Automation

has been involved on many projects where direct labor costs were reduced by more than 70 percent, throughput doubled, and ROI achieved within 24 months. Many operations also see a significant decrease in lost-time injuries and worker compensation claims.

Strategies for moving jumbo baskets in and out of a retort

There are a number of basic designs for automatically loading and unloading baskets and retorts. One of the most in demand solutions is the shuttle. Shuttles are designed for extreme duty and handling payloads up to 24,000 pounds.

The shuttle is an automated delivery system — PLC controlled — that transports and loads a batch-at-a-time collection of baskets for the retort. Product enters the retort room and is routed to a basket loading machine. Loaded baskets are



Automated Retort Shuttle

automatically staged until a batch has been accumulated. The shuttle then automatically picks up the product and load and delivers it to the retort. The shuttle is typically built with a load-side lane and an unload-side lane to simultaneously handle unprocessed and processed product. The most advanced shuttles offer a failsafe design that makes it impossible to mix unprocessed with processed product. Following the retort process, the shuttle conveys finished

Retort Room Automation

product to a basket unloader. From there, finished product exits the retort room via conveyor.

The optimum shuttle is equipped with an extending lance arm for use in loading and unloading baskets into the retort. These shuttles have the lowest total lifecycle cost, are the easiest to maintain, and offer the highest uptime.

The lance arm design provides several significant advantages in the way baskets are handled. The lance arm eliminates the need for a powered conveyor inside the retort, which means that there is no need for high maintenance chains, dogs, springs, and encoders. Similarly the lance arm eliminates the need for external motor, gearbox, encoder, drive shaft, and pneumatic actuator required for the mechanical conveyor used in rotational retorts.

Shuttles are not the only option for retort room automation. Some companies install automated loaders and unloaders and convey jumbo baskets to large retorts via carts and an electric-tugger system to remove the physical labor of pushing the baskets. While this is not the full level of automation offered by a shuttle, it does significantly reduce direct labor while increasing throughput. Another option is the application of automatic guided vehicles (AGVs) for loading and unloading the retort. Whatever the loading, unloading, and conveying strategy, one constant factor remains — the operation must significantly increase basket and retort size to fully take advantage of economies of scale.

Retort door design and automation

For those packagers interested in adopting a shuttle strategy, it is vital to purchase a retort with a vertical orbiting door. Use of a swing-open door causes a

Retort Room Automation

gap between the shuttle and the retort. This requires the shuttle to extend and retract — in effect having to repeatedly bridge the distance between the retort loading position and the normal shuttle traverse position. The extend/retract transition adds extra time to the loading/unloading phase of every retort cycle. It also adds complexity and maintenance issues to the system. An orbital vertical door reduces cycle time and

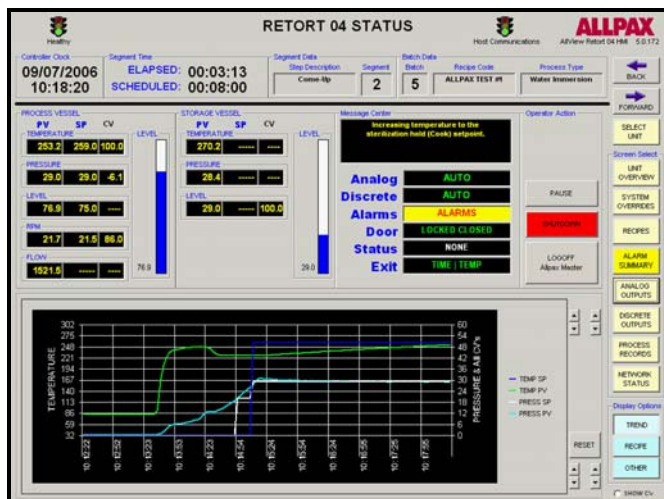


Vertical Orbiting Retort Door

mechanical and control complexity of the shuttle. A vertical orbiting door can also decrease the footprint of a retort by as much as 20 percent.

Software strategy

The supplier's control software must be FDA/USDA compliant. It is best to



Retort Control Software

work with a retort room supplier that develops its software in-house. The reasons for this include improved integration of hardware and software, the supplier's ability to effectively make process improvements,

and the fact that a single point of contact improves response time. Many

Retort Room Automation

suppliers do not advertise the fact that they do not create their own software. Be sure to inquire about this at the exploratory stage of an engagement. Many companies complain, and rightly so, that documentation from European and Asian suppliers is often difficult to use and leads to less than optimum utilization of the system — operators simply do not understand how to coax the most out of the system or make changes.

Factory acceptance testing

It is one thing to install stand alone machines and mechanical systems and quite another to adopt retort room batch automation. Allpax believes so strongly in the value of automation to the customer that a factory acceptance test is included with every automated retort room system it sells. In fact, Allpax has found that with its factory acceptance test policy its startup and commissioning are one-third to one-half shorter than industry average. During the acceptance test, the customer's personnel have the opportunity to work with and learn from the team that designed and built the system. Personal relationships are formed, improving communication between customer and supplier during the life of the system.

Automating the retort room is not only a practical alternative today, it is essential to lowering labor costs and improving throughput. Jumbo baskets delivered to orbital-door retorts via shuttle or other means are important elements of a complex system. There are many more intricacies to become familiar with. The highlights described here help to start the discussion, making it possible to ensure that the right questions are asked upfront and that operations personnel

Retort Room Automation

at the consumer packaged goods company have a clear vision of the possibilities and advantages of retort room automation.

For more information:

Eric C. Hanrahan
Director of Project Engineering
Allpax Products, Inc.
13510 Seymour Myers Blvd.
Covington, LA 70433
Phone: 985-893-9277
Email: Erich@allpax.com
Web: <http://www.allpax.com>