

*by FJB Systems LLP
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When a food processor decides to either start up or expand, he is faced with two major choices; to build from new or to convert an existing building. Fitting out an existing building to create a viable and efficient food processing plant presents many complications that are not necessarily incurred when building from new. Issues such as adequate drainage and upgrading site utilities need to be addressed and complex process layouts need to fit into the existing space while still allowing for optimum production levels without bottlenecks. However the decision to move into an existing building does have its advantages too. New builds can be expensive and obtaining planning permission can be time consuming. Often finding available land means relocating to another area. This could result in the training of a new work force and the loss of valuable experienced staff who do not wish to relocate.

In 2004, this is exactly what New England Seafoods Ltd decided to do. New England Seafood is a specialist UK based importer of prime exotic fish & shellfish, supplying retail-ready product to major supermarkets, the food service sector and the airline trade. New England Seafoods wished to build a new 'state of the art' fish processing facility to replace an existing aged facility and had already located a suitable site complete with an existing warehouse. The warehouse required a total 'fit-out' in order to convert it into a bespoke food processing plant. It was imperative that the finished factory meet with the strict standards of quality imposed by its customers and international standards, while still remaining within the budget constraints set by New England Seafoods.

Following various in-house designs and unsuccessful discussions with local contractors, New England Seafoods decided to seek professional advice and contacted FJB Systems. FJB Systems are independent designers, project managers and consultants specialising in providing services solely to the food industry. FJB Systems were subsequently hired to undertake the full design of the proposed factory as well as working on behalf of New England Seafoods to obtain competitive quotations for the project and project managing the complete project through the construction and commissioning phases.

Step 1 – The Process Layout

To ensure that the new processing facility met with the requirements of New England Seafood, FJB Systems met with the management and production staff to talk through the Process Layout in detail. Layouts were then prepared at the FJB Systems offices and these were then presented to New England Seafoods, where the designs were viewed using computer based design software which allows changes to be instantly made and viewed in real time. In this way the layout could be reviewed for bottlenecks or other issues that may slow down or decrease production levels and then honed to improve people flows, product flows and product hygiene.

"Fitting out an existing building to create a viable and efficient food processing plant presents many complications"



Standards imposed by authoritative bodies (EU Fishery Products & Shellfish Regulations) or customers needed to also be addressed. It is imperative to the success of a project that all of these issues are resolved at this early stage.

Proper design of the Process Layout can save a business money by ensuring that the staffing levels are kept to a minimum, production flows freely and that machinery is used at its optimal levels. Proper design will also ensure that construction costs are minimised.

Stage 2 – Tendering

Once an optimal Process Design was developed, the next step involved the preparation of the necessary drawings and specifications to put the project out to competitive tender.

FJB Systems split the project into seven specialist elements; building work, insulation panels, electrical, mechanical, refrigeration, specialist flooring and process equipment. By separating the documents into separate elements, it was possible to tender each of the categories to at least three separate specialist suppliers, resulting in some 20 tender returns.

Following detailed technical and commercial discussions with the most promising tenderers, contracts were then awarded to the best suppliers in each discipline and FJB Systems prepared the relevant contract documentation, nominating the contractors to a principal contractor (the builder) in order to enhance on-site co-ordination. This format allowed a significant cost advantage over the ‘simple’ system of tendering a ‘turnkey’ project to a single contractor.

Stage 3 – Technical Issues

The existing warehouse consisted of 2000m² of floor space whilst New England needed over 3000m² requiring possibly even more area at a later date to accommodate expansion. In order to achieve this, a mezzanine floor was introduced covering the entire span of the warehouse, providing an initial floor space of 3000m². Due to the heavy weight loads of additional equipment which the present warehouse had not been designed to hold, namely, refrigeration evaporators, services pipework, insulation panels, as well as a newly proposed concrete floor (with potential packaging loads of up to 5.0kN/m²) it was decided that the structure for the new mezzanine floor would be designed to support all this equipment whilst being totally independent from the existing warehouse structure.

As a floor was already in place, a number of options remained as to how best to introduce the requisite process area drainage and this was particularly complicated due to the poor soil structure and soil load bearing capacity in that region. FJB Systems devised

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“Proper design of the Process Layout can save a business money by ensuring that costs are kept to a minimum and production is optimised”



three possible solutions. One alternative was to saw cut individual drainage channels, lay the drainage and then re-concrete these channels. The floor falls would then be built up by using a co-polymer resin screed, topped with a polyurethane floor topping. A second solution was to build a raft slab built over the existing floor slab, suitably reinforced to accommodate the resultant loads of the mezzanine structure. The final solution was to dig up the entire existing floor and start again using new foundations and pour the new floor to falls.

These various options were provided to the building contractors tendering for the project and in this instance, under competitive conditions, it was determined that the most economical solution was to completely dig up the existing floor and lay the drainage and floor again.

The general wall and ceiling construction of the factory was achieved using PIR cored insulation sandwich panels with a white Stelvetite food-safe finish. Floors were sloped to drains with gradients of 1:50 in wet areas and 1:100 in dry areas where product is packaged. Due to the wet nature of the 'Goods-in' end of the factory (incoming fish arrive packed in ice), it was deemed necessary to incorporate particularly steep falls to prevent unhygienic water ponding. Close attention was paid to the design of the floors in order to ensure consistent falls a 'quadrant' arrangement of drainage was agreed so as not to end up with inconsistent falls throughout the floor and the resultant ponding (*unfortunately, a familiar site throughout UK food factories*).

The refrigeration system chosen was a central R404a DX system utilising glycol as a secondary refrigerant. This enabled a low refrigerant charge to be used, eliminating the risk of leaks, as well as simplifying the construction and maintenance of the plant. Ammonia was considered as an option but was eventually rejected on grounds of high capital cost. Due to FJB Systems' proper calculation of heat loads and specifying of evaporator surface areas, consistent room temperatures are achieved, even in the height of summer.

Due to the requirement of specialist gases (CO₂, O₂ and N₂) for the modified atmosphere packaging used in the finished product, specialist liquid gas storage tanks, relief valves, and pressure regulators with degreased pipework were installed to supply the heat sealing machines in the main production area. In order to hygienically reticulate the services to the machines within the process areas, specialist service columns were designed and built to reticulate the modified atmosphere gases, compressed air and power to the machines.

The factory amenities incorporate both male and female locker rooms all with shower facilities to enable staff to change and

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shower both prior to and after a working day. A canteen facility has also been included to provide a rest area for lunch and breaks.

Existing office facilities were upgraded and expanded to house the entire New England Seafood sales, Marketing, Quality Assurance, Production and Accounting staff. The offices included high speed CAT6 data cabling to network the office and QA system with the production areas in order to monitor yields and throughputs. This was all co-ordinated and designed by FJB Systems.

FJB Systems visited the site regularly to ensure that the contractors were performing on time and that FJB Systems' high standards of quality were being met. Any technical, programming or budgetary issues were addressed as the project progressed and construction costs were kept to a minimum.

Summary

FJB Systems enabled this 'retail ready' fish processing factory to be delivered within budget, on time and to the high standards required of a plant that manufactures product for both Waitrose and Marks & Spencers. This was achieved by well thought out planning of the process layout, detailed definition of the tender specifications and drawings and by close project management throughout the project to ensure that all contractors delivered what had been promised and to ensure that they were co-ordinated properly. Efficient tendering of specialist trades allowed smaller companies to be used with resultant cost savings and allowed the whole project to meet the tight timescales & budgets present.

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