7.0

PROGRAMMATIC INTENTIONS AND LEGISLATION

This chapter outlines the programmatic decisions that were made based on the analysis of the slaughtering process and regarding legislation. The chapter contains an overview of the final design and the overall intentions of the project.

Figure - 7.1 - *Photograph of carcasses waiting to be inspected (By Author).*

PROGRAMME

PROGRAMME VS EVENT

"Programme is to be distinguished from 'event'. A program is a determinate set of expected occurrences, a list of required utilities, often based on social behaviour, habit, or custom. In contrast, events occur as an indeterminate set of unexpected outcomes. Revealing hidden potentialities or contradictions in a program, and relating them to a particularly appropriate (or possibly exceptional) spatial configuration, may create conditions for unexpected events to occur.

(Tschumi, 1987, p. 48)

The dissertation investigates the abattoir in a more public context and therefore the programme is to be conceived as a series of events setting up a dialogue with its surroundings and establishing a public discourse. The typical compact process of production is to be stretched out linearly into a sequence of events where at any moment the public can interpose and bear witness.

INTRODUCTION

Historical attempts to industrialise the slaughtering process at the cost of humane treatment of animals and hygienic conditions under which the meat is slaughtered and processed, has led to legislation setting out basic parameters to which the new abattoir must comply. The dissertation proposes to reintroduce the abattoir into a densely populated area, therefore these factors come under extreme scrutiny in the design of the abattoir. The legislation and the setting of the abattoir influence the general layout and the circulation.

The programming legislation as published by the Red Meat Association of South Africa and the Department of Agriculture, is adhered to and can be found in Addendum A. The legislation only provides a minimum compliance and the design strives to improve the conditions for the animals and workers alike. The design proposes a feedlot to be erected on the open agricultural land across the road from the site which is to serve both private and public interest. This allows the transportation of the animals to be removed from the process, which eliminates injuries to animals during transportation and also decreases the carbon footprint added to the slaughter process by extensive distances which these animals have to be transported. The setting of the abattoir in a more densely populated area reduces product transportation, further reducing carbon loads.

The abattoir strives to harmonise working conditions by allowing for ample natural daylighting and by introducing courtyards to assure not only north and south light but also views from the building. Further, the design aims to facilitate a medium to large scale production line, which is directly fed from the feedlot.

The civic role of the abattoir is augmented through a series of output pavilions which recycles the general animal waste of the abattoir and reworks it into marketable products for public consumption. The design also includes a formal and informal meat market, serving the public directly. The pavilions are situated directly on the new high street and establish a platform for engagement between the abattoir and the public realm. The design realigns the consumer and the product and establishes a sense of ritual and sacrifice to an otherwise industrial process.

The public interface allows for active surveillance of the slaughtering process and helps to reduce malpractice and cruelty to animals as well as unsustainable habits regarding wastage.

The size of the facility is designed to accommodate the slaughter of 75 to 300 head of cattle per day, with most of the slaughter taking place from 06:00 am till 10:00 am (average slaughter time of Gauteng abattoirs). After the slaughter process ,the output pavilions will become active and serve the public realm

Figure - 7.1 - Mechanical slaughter versus ritual slaughter and the sequence of events (By Author).

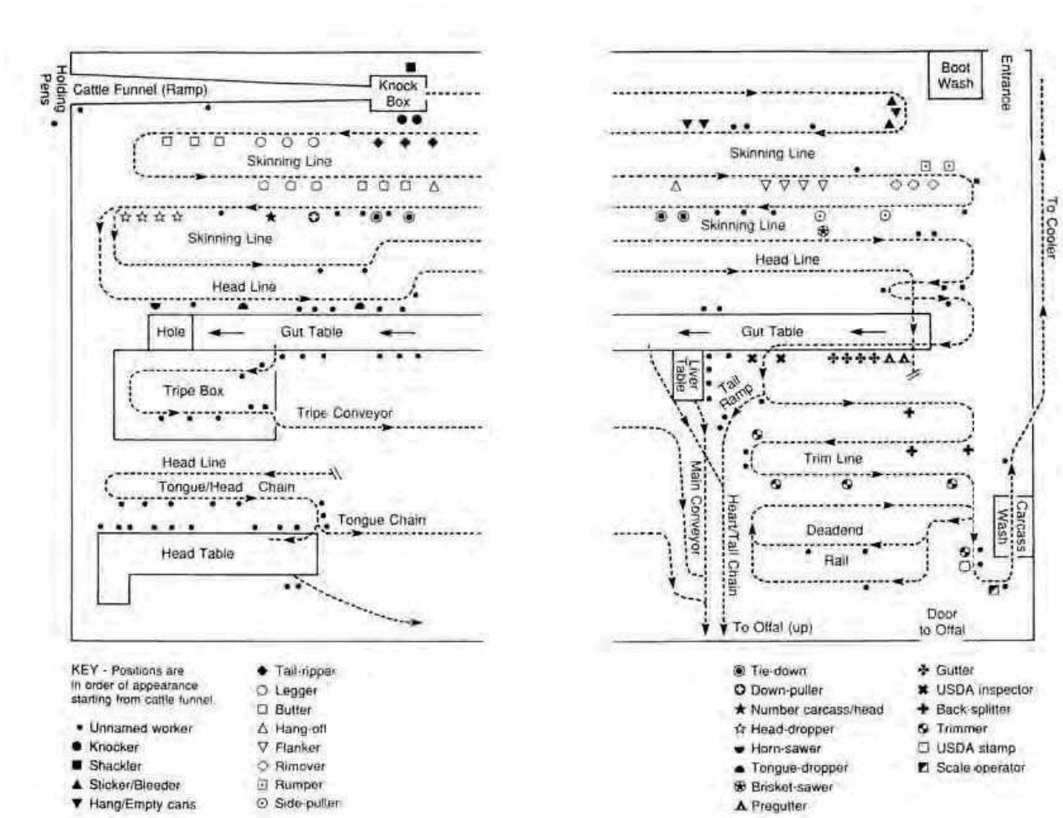

Figure - 7.2 - A detailed layout of abattoir processes .

by providing processed materials to local producers. The design also accommodates facilities for local producers to buy, sell and reproduce from these products.

GENERAL GUIDELINES SET OUT BY THE DEPARTMENT OF AGRICULTURE

General:

The facility should be of such a design, construction and finish , and must be equipped in such a condition and so located that they can be used at all times for its intended purpose, without creating a health hazard. This must be done in such a manner that meat can be processed hygienically on the premises and can be protected by the best possible equipment against spoilage of any kind.

Premises:

The premises must be of such a design that it is rendered dust and mud free. The abattoir must be equipped with an enclosed drainage system for the disposal of effluent and sewerage. All loading areas must be curbed, paved, drained and roofed.

Cross Flow:

The design of the facility must ensure that clean and dirty areas are separated with no cross flow between them. Condemned or inedible meat must be stored separately and must be inspected without coming in contact with other meat.

Requirements for interior of building rooms:

In the abattoir where meat and animal products are handled, all other human amenities, the rooms must be of such size as not to compromise hygiene. All floors and stairways are to be smooth, impervious, hard wearing and non slippery. Surfaces are also to be joint and crack free. Floor drainage design must ensure that floors are sloped at a gradient of no less than 1:80 towards drainage points, and the drainage should happen in the direction of clean to dirty areas. All interior surfaces must be smooth, impervious and washable. All working areas must be well ventilated and have artificial and natural lighting of at least 540 lux where meat is processed and 220 lux in other work areas.

Lairage:

The minimum requirements for lairage capacity states there should be a minimum of 1.75 m^2 allowed per head of cattle (cow). Lairages must be equipped with permanent floors that are curbed and drained for ease of cleaning, without obstructing the flow of animals. All surfaces which receives animal traffic are to be non slippery and drains are to be covered. The minimum width of the lairage passages is 1.2 m wide for cattle and should be completely free of loose objects. All holding pens must have gates no less than 1.8 m high and must be equipped with water troughs 900 mm high for cattle.

Stunning, Hoisting and Bleeding:

To comply with the humane restraining of animals prior to stunning and bleeding, an approved stunning box and a holding pen with minimum dimensions of 2 m x 2 m and a hinged gate should be provided which reduces floor space.

For the stunning of animals, a silenced captive bolt stunner is required or approved electrical alternative. Equipment to hoist and bleed stunned animals must be provided. The blood from the bleeding process must be collected and stored in closed containers prior to removal. For cattle bleeding, the minimum rail to floor dimension should be 4.4 m in the case of a fixed rail.

Dressing and Evisceration Facilities

The minimum clearance for rails and equipment in these areas are 3.4 m from floor to rail. Carcasses should at all instances not be closer than 1000 mm from any wall or piece of equipment. Rails with hooks are to be 400 mm from any wall, and carcasses are not to touch the floor or wall. Rails should be 700 mm from columns, pillars or the side of any doorway.

Meat Inspection Facilities

These facilities should be equipped with racks, platforms and any other equipment required for meat inspection. Marked and leak proof lockable containers must be provided for condemned meat prior to disposal.

Chillers:

The chillers room must be designed to hold at least the entire slaughter of the day. All rails in the chillers should be a minimum distance of 1000 mm from the walls and carcasses should be spaced at a minimum of 660 mm from each other to ensure

A SPACE/PLACE FOR SLAUGHTER

The process of slaughter consists of two distinct parts, namely; a dirty process which embodies the process from stunning up until splitting, after which it is replaced by the clean process which, consists of inspection up to and including the packaging process.

These to processes require completely different spaces; the dirty process requires a much more hardwearing type of space, whilst the clean process requires a hygienic controlled environment. The abattoir is to focus on the slaughter of bovine only. The process and accommodation will be designed for services surrounding the slaughter of bovine and the recycling of the waste concerning this process.

The processes housed in a bovine abattoir are as follows: lairage, stunning, bleeding, extremity removal, head removal, skinning, evisceration, splitting, inspection, chilling, cutting, deboning, processing and packaging.

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Figure - 7.3- Meat grading stamps prescribed by the Department of Agriculture

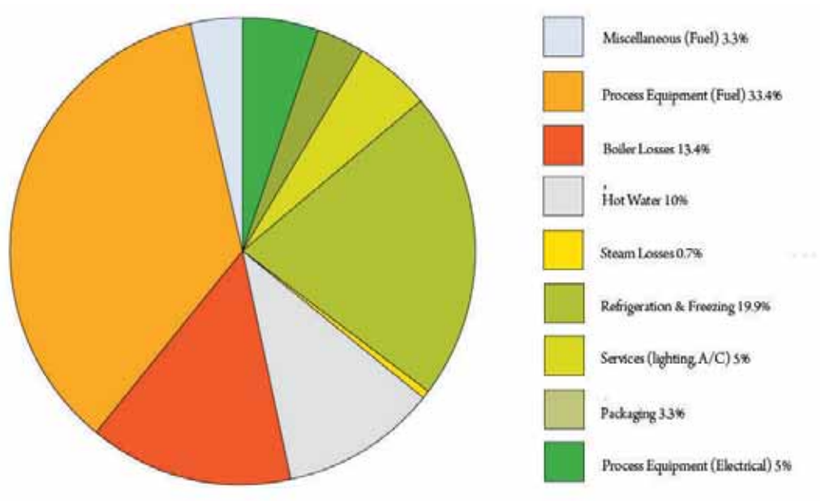

Figure - 7.4- A pie chart indication the different types of electrical consumption within a typical abattoir.

proper air flow.

Dispatch Areas

Dispatch areas are to be properly equipped for quartering, marshalling and loading of carcasses or processed meat.

Temperature Control:

The air temperature in the cutting hall must be 12 degrees Celsius or less. During cutting, wrapping and portioning of meat, the core temperature of the meat must be maintained at 7 degrees Celsius or below.

TECHNOLOGICAL ISSUES / OPPORTUNITIES

Water Use / Supply:

The abattoir requires a pressurised water connection according to SANS 241 standard for drinking water. Water points with cold water, hose pipe connections with a minimum of 40 degrees Celsius for sanitizing all areas of the abattoir and hot water at a minimum temperature of 82 degrees Celsius in sterilizers for disinfecting hand equipment, need to be supplied.

Recycled grey water can be used for the general cleaning of the abattoir, but not for the washing of the carcasses. Water can be put through the anaerobic process and a series of UV and micropore filtration systems to achieve potable water. Therefore, a closed loop water system, independent from the municipal sewer, must be used to recycle and reuse as much water as possible.

Heating and Cooling:

Abattoirs require large amounts of cooling for the chillers, deboning and packing halls. The average temperature during operational hours should not exceed 12 degrees Celsius and therefore requires constant cooling. Therefore the design of an abattoir should not only rely on mechanical systems to cool spaces, but also look at passive design to take the load off these mechanical systems. A vast array of different refrigeration systems are available, but for this dissertation the absorption chiller is used within the closed loop recycling system (Further discussed in the technology chapter). The absorption chiller uses waste heat to power the system and will be used in conjunction with a biogas digester from the waste recycling and geothermal pipes situated on the roof of the abattoir. The absorption chiller uses significantly less energy than other compressor based refrigeration processes. Some key characteristics of absorption chillers:

• Employs heat and a concentrated salt solution (lithium bromide) to produce chilled water.

• Eliminates ozone depleting refrigerants. Water is the refrigerant; lithium bromide is the absorbent.

• Uses the lithium bromide solution's high affinity for water (hygroscopic properties) to create a high vacuum in the evaporator/absorber. The vacuum causes the refrigerant (water) to boil at 2˚C or 36°F.

• Absorption refrigeration cycle uses very little electricity compared to an electric motor-driven compression cycle chiller.

• Allows use of various heat sources: directly using a gas burner, recovering waste heat in the form of hot water or low-pressure steam, or boiler-generated hot water or steam.

Waste Recycling:

The design proposes a closed loop recycling waste system, which is to utilise all waste from the abattoir. Organic waste, which cannot be processed into by products, will firstly be sent to an on site electro coagulation plant, to remove suspended organic matter and nitrates, and then to a bio-gas plant situated in the tri-generation area of the scheme. Here all organic matter will be converted to energy via methane reactors, which in turn will power the absorption chiller refrigeration plant through the waste heat produced.

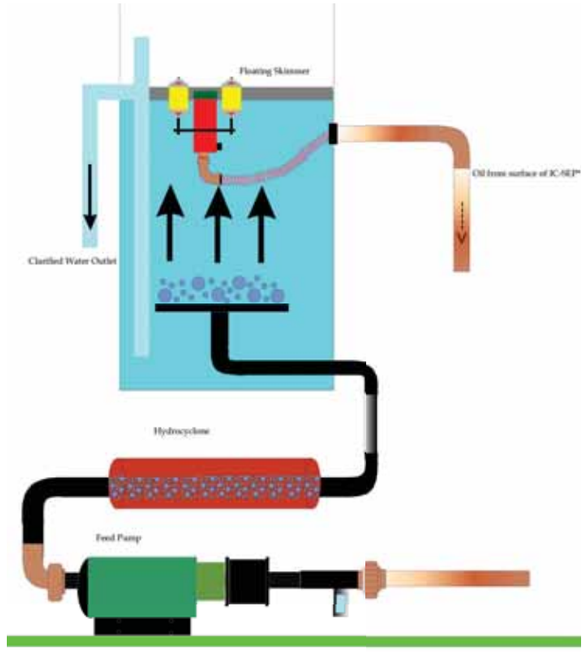

Figure - 7.5 - Example waste water treatment - Deoiling IC-SEP* System.

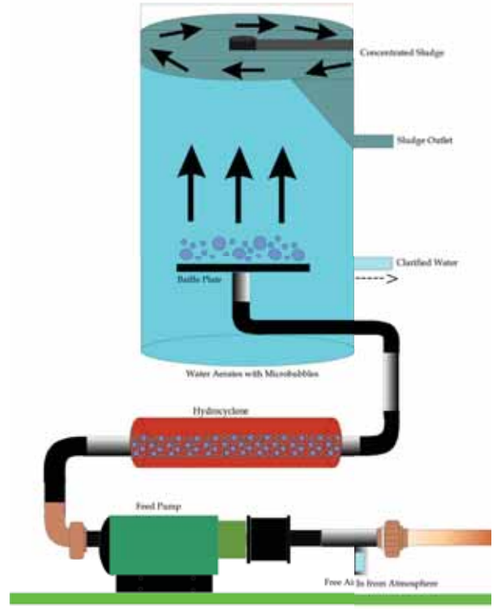

Figure - 7.6- Example of waste water treatment - Solids Removal IC-SEP* System.

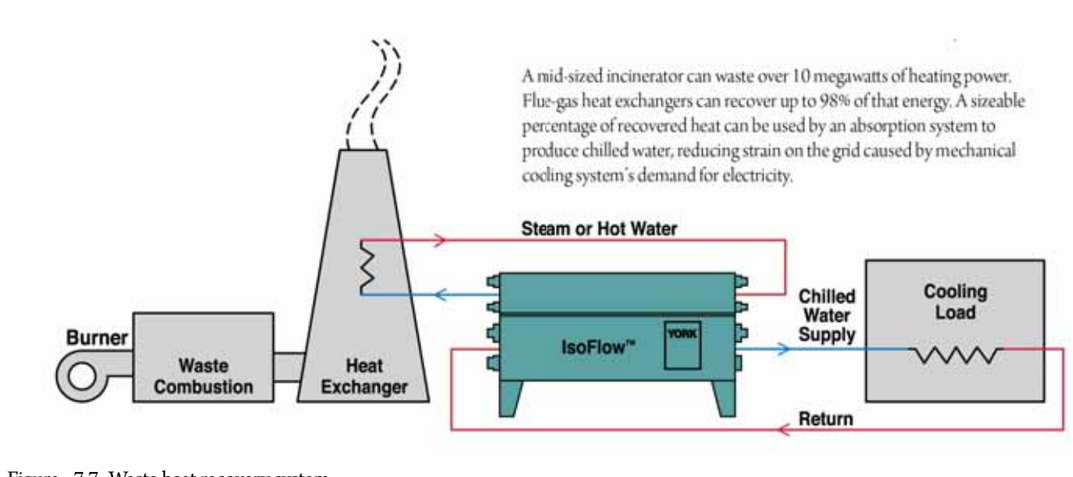

Figure - 7.7- Waste heat recovery system.