

Creating sustainable excellence in centralised distribution

Retail giant Woolworths is a South African-based company with an annual turnover in excess of R18-billion, servicing a wide range of market sectors with product categories that include food, clothing and general merchandise in homeware, beauty and digital products.



The Woolworth's national footprint includes a base of some 355 outlets, which includes corporate full-line stores that offer clothing, foods and general merchandise; foods stand-alones and Engen concept stores; an online shop (In-The-Bag); and various local, national and international franchises.

The supplier base includes 250 clothing and general merchandise suppliers; 450 food suppliers; and local and import/international suppliers.

The problem

The Woolworths supply chain faced significant challenges in 2004 due to aggressive store rollouts and the associated volume growth.

The supply chain in Gauteng fragmented into five distribution centres, which did not fully support the business strategy of centralised distribution. The five Gauteng centres were all running at capacity and could not support future growth. The five centres also negatively influenced the delivery of cost-effective availability.

Woolworths supply chain set its goal as: deliver and sustain competitive advantage through cost effective availability achieved by supply chain excellence.

All aspects were explored. This included conducting an extensive distribution network analysis study to determine the optimum locations for, and number of distribution facilities in Gauteng, especially in terms of cost effective transport operations through which to deliver all products. This took into account the location of the company's current and projected stores. Traffic impact studies examined road networks and future projections, and traffic patterns were examined as an essential part of the feasibility investigation. This enormously complex analysis concluded that a single centralised distribution facility was required.

A centre-of-gravity study was carried out, which incorporated a 20-year view and identified Midrand as the ideal location.

A people impact study identified the needs and concerns of the current staff in terms of relocation and travel requirements, and

examined the availability of new personnel to be drawn from the Midrand area.

The project that followed would earn Woolworths recognition in the form of an LAA Platinum Award for distinction in logistics for creating sustainable supply chain excellence in centralised distribution.

The end result was a DC design of 78 000 m² from which all Woolworths products, from all supply chains (flow through, cross-dock and warehouse) and all temperature regimes, could be delivered to stores in a single delivery. The DC currently processes Gauteng, Free State and some of the KwaZulu-Natal volumes.

Sustainability, in support of the Woolworths 'Good Business Journey', was the cornerstone during the design and development of the facility. Most notable was the stringent performance standards demanded to achieve that journey – predictable deliveries to stores were to be made within 15-minute on-time delivery windows to all stores every day, and this practice achieved high results.

The distribution facility also had to support the supply chain vision of cost-effective availability based on reduction in distribution costs post implementation.

The facility

Land was purchased (2004) in Midrand, an extensive environmental impact assessment (EIA) process was concluded and the property was rezoned for industrial use. The UK-based Logistics Planning Consultants (LPC) was appointed to design the platform and building footprint, develop conceptual designs and determine generic and materials handling specifications. Land works and construction commenced in June 2005 and practical completion was celebrated in December 2006. Deployment of the old facilities began in January 2007 and was completed by April 2007 – all according to the original 2004 plan.

Not only was construction completed on time, but also within the project budget of R391,6-million. Another noteworthy achievement was that during the construction period, a BEE rating (Department of Trade and Industry index) of 43 percent – against the target of 40 percent – was delivered.

To cater for projected future growth, the platform was created whereby the current footprint of 78 000 m² can be expanded to 150 000 m² with no disruption to operations. The new facility features an 11,5 m-high ambient warehouse; a tray wash and equipment centre and a number of other essential storage areas including an 11 m-high freezer, running at -30 degC; a 6 m-high cold room, functioning at 0-5 degC; an 11 m-high 'choc box' set at 18 degC; and a 'banana box', operating at 16 degC. Office, plant rooms, gatehouses and other buildings make up the rest of the facility.

The results

The board's target of cost-effective availability based on reduction in distribution costs post implementation was achieved. Further achievements include on-time deliveries to stores that improved from 92 percent to better than 96 percent, bearing in mind that the target is set within a 15-minute window where even a one minute out-of-window signifies a service level failure. More than 1 000 supplier delivery vehicles pass through the facility every week, each within a turn-around times of under one hour. This signified an improvement from 59 percent to 86 percent, allowing suppliers more time for other utilisation of their vehicles. Supplier primary distribution kilometres travelled reduced by 4,6 percent, and secondary distribution kilometres – delivering from the DC to stores – dropped by 7,3 percent.

Whilst processing in excess of 44-million cases annually – around receiving, picking, warehousing and despatch – logistic efficiencies were still improved.

Taking the CPIX, fuel price increases and investment in the new DC into account, the 2008 distribution costs as a percentage of cost-to-sales had dropped to below the 2005 levels.

A vastly upgraded systems management and IT infrastructure resulted in several areas of improvement. A sophisticated WMS allowed the integration of multiple warehouses on the same facility with the ability to plan and schedule staff across disciplines; warehouse capabilities could be optimised; inbound and outbound scheduling was facilitated; and route management and planning was enhanced.

An integrated building management system monitors biometrics access control, CCTV, controlling lights, all plant and machinery, alarms (fire, temperature control, ►



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unauthorised access, ammonia system and other), electric perimeter fences, and more.

Telephony and networks operate on a VOIP network.

Competitive advantage

Nationally Woolworths operates four DCs – in Midrand, Durban, Cape Town and Port Elizabeth – with multiple warehouses per facility and using trunking by road extensively between facilities. The centralised distribution model leads to several competitive advantages.

All suppliers deliver to a single point, resulting in full control over product quantity and quality, and sell-by dates can be verified for any full consignment. Supplier administration is simplified, leading to another cost price reduction.

For the distribution centre, processes are simplified, driving out logistic efficiencies. There is full control over product, including flow and cold chain maintenance. Supply chains become flexible, with an ability to respond quickly to market demands.

There is a single management and administrative structure and a simplified IT infrastructure. Outbound

transport optimisation results in the ability to deliver all products from all temperatures in a single delivery to stores, and to co-load small stores where practical.

All trucks are insulated and refrigerated, allowing cold chain products to be loaded and then segregated by means of a 'bun' to allow normal ambient products to be loaded onto the same vehicle. All perishable products delivered to the facility today will be in stores tomorrow.

At the stores, minimal infrastructure and labour in back-areas is required as stores receive a daily delivery of a full catalogue. The model supports store growth for small footprint stores with limited back office space.

Key learnings

A number of key learnings emerged from this project.

- Benchmark your design with world-class facilities and ensure that your professional teams work towards the same standards. The Woolworths project manager and professional team examined a number of overseas facilities to determine the final direction of the Midrand design and operating standards.
- Simplicity and flexibility should be key principles in the design.
- The design should support the principle of economy of effort with an optimum flow of vehicles around the DC, product through the DC and for people in the DC. For example, the DC was colour-coded to clearly identify the inbound and outbound sides, thus ensuring that supplier vehicles and Woolworths vehicles stay separated and cause no congestion.
- Building size scoping – don't spend hours number crunching, use 'gut' feel as well.
- Limit the implementation of new systems, such as access control, during deployment to new facility – implement and test at old facility first and learn from the results.
- Commence recruiting staff from areas close to the new facility at least one year prior to deployment,

and prepare for lots of training during the deployment phase.

- To minimise the impact on staff transport to the new facility, ensure negotiations with taxi organisations, at government and local level, are done effectively.
- Thorough identification of, and active engagement with, all stakeholders is a critical factor in the capacity to deliver a project of this magnitude.
- The big change impact on a significant deployment

like this (1 000 people at more than 50 km) on the staff can never be underestimated.

The way forward

The Woolworths results in market share and competitive advantage are in no small measure due to the company's logistics achievements. The Woolworths supply chain sets international standards in SA and advanced planning is set to even further enhance this capability.



Environmental impact assessment

Every aspect of the design and construction of the facility was subjected to scrutiny from a social and environmental impact perspective, ensuring that Woolworths minimised the impact on the surrounding environment and communities.

Assessments were done around aspects relating to cultural heritage, agricultural potential, ecological factors, visual impact and traffic requirements.

Some of the outcomes included the unearthing of Stone Age artefacts now being preserved; an on-site pan was identified as the habitat of the endangered African bullfrog so it was isolated and a surrounding 200 metre no-go buffer zone was created in an effort to protect the species; 300 mm of top soil across 47 hectare of area to be developed was removed and deposited in 18 hectare of terraces zoned for agricultural use.

It also resulted in a number of key sustainability design initiatives being included in the development of the facility and its surroundings.

Water: Two sets of ponds with a capacity 8 500 m² were created to retain all roof and apron rain water, which is used for all site irrigation. Another system captures all 'grey water', which is recycled and used for toilet flushing. Two boreholes, linked to a Chemfree system, pumps absolutely clean water into the potable ring main for normal consumption.

Electrical: Every effort is made to minimise the use of

electricity. The building was designed to benefit from an optimum level of natural south light. Intelligent lighting was installed in the offices and ablutions, and is capable of auto dimming and switching off when no movement is detected for a preset period. A centrally controlled light management system was installed for the DC floor. Solar heating serves the ablution block. Glycol heater mats in the freezer floor are heated with reclaimed heat from the refrigeration plants.

Green roofs: As a 'first' in South Africa, Cynodon Gulf Green grass was planted on certain roofs to minimise heat build-up in the general environment as well as in the working areas below, for example, in the main office block and gatehouses.

Other features: The ammonia refrigeration plants are driven with food-grade propylene glycol that has no impact on the ozone layer.

Known as 'air scrubbing', the evaporative cooling system is fitted with special filters that clean the air that is drawn in and later emitted around the plant.

Landscaping: An ambitious planting programme was instituted and focused on indigenous plants endemic to the Highveld. This process saw 1 500 trees being planted in the first phase with many more to follow, 210 000 m² being hydro-seeded and 8 500 m² planted with shrubs. Other gardening developments included the excavation of large rocks that were reused as landscape features. •