

Dynamic Transport Optimisation - Austral Bricks

Background

The Austral Brick Company is a major player in the brick industry. Since its inception in 1908 the company has transformed from a state based operation into a national organisation with manufacturing operations in NSW, Victoria, South Australia, Western Australia and Queensland.

Austral's manufacturing operations are continually upgraded and modernised, as they implement the world's best technology and environmental protection features to ensure the maintenance of production efficiency and quality.

To further improve on their production efficiency, Austral sought out Opturion's services (via our partner Orcoda) to create a Dynamic Transport Optimiser based on a model of their route optimisation problem. This model contains the decisions that need to be made in order to generate a schedule (e.g. which vehicle is an order assigned to, what time of day does a vehicle begin its route etc.). It also specifies the constraints that exist on, and between, these various decisions.



Business Requirements

Austral's route optimisation problem, had the following decisions:

- All deliveries in a load must be completed before any further pickups can be made.
- A vehicle's first load should utilise the capacity of the vehicle to its maximum.
- Preference should be given to delivering heavy orders at the beginning of the day.
- Loads below a given size threshold should not be allocated.
- High priority orders must be delivered between 7:00-9:00am.
- Pickups or deliveries may have to occur within given time windows.
- All orders in a load must be picked up from the same location.
- All orders to the same location should preferably occur with the same vehicle, preferably in the same load.



- It must be possible to schedule the pickup and drop-offs of additional equipment. For example forklifts.
- Unnecessary loaded travel time should be avoided, thus loads should not be split between zones.
- Drivers are paid per load. They receive a fixed per-load payment, plus an amount based on the distance travelled for that load.
- If a contractor vehicle is used, then it must be assigned sufficient work for its driver to make a profit.
- The fleet is split into "core" fleet and contractors; preference should be given to the use of core fleet.
- Small loads would incur an extra driver payment.
- All constraints and preferences should be configurable, since not all of them apply to all states.

The Solution

The solution consisted of an optimiser that contained all of Austral's constraints and decisions as a list of presets which could be switched on/off when creating a schedule. The optimiser ensured that every solution satisfies all of the selected constraints, creating an optimal schedule for the next day's deliveries.

• Batch Loads:

- The optimiser ensures that all deliveries in a load are completed before any further pickups can be made.
- The optimiser is able to generate schedules that have one load per vehicle.
- Optimiser can also generate schedules that fully utilise the first loads of a vehicle and un-allocate under utilised loads.

• Batch Costs:

- The optimiser sets a fixed cost that is incurred once per batch, and has the ability to calculate an extra cost for small loads.
- If the distance travelled to service a batch is less than the assigned minimum distance, a minimum distance amount will be used instead.

• Zoning:

- The optimiser has the ability to assign orders within each load to compatible zones, to prevent unnecessary travel time (these zones have been predetermined).

- **Order Priorities:**

- High priority orders will be allocated a delivery time between 7:00am – 9:00am the next day, regardless of batch load constraints.

- **Core and Non-core fleets:**

- Order's will be assigned to the core-fleet before they are assigned to the non-core fleet.

- **Equipment handling:**

- Include pick up and drop off of equipment.

- **Pickup's and Deliveries:**

- All of the orders in a load will be from the same pickup location, or delivered to the same delivery location.
- All the pickup locations beginning at customer sites rather than at depots will be treated as identical location.
- Preference will be given to loads that deliver all orders to the same location (i.e. customer) in the same vehicle, possibly over multiple loads.

- **Time-of-Day dependant transit times:**

- The optimiser has the ability to model the effects of peak/off-peak hour traffic on transit times.

Customer Outcomes

Opturion's optimiser went live in 2014, and has been in use for over five years. Austral saw an immediate increase in efficiency and customer satisfaction with its pick up and deliveries in Victoria. Since then, the system has also been implemented to aid with their operations in Western Australia, New South Wales, South Australia and Queensland.

Further Information

Please contact Opturion for a demonstration, or give us some data that we can use to identify potential benefits.



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