

How To Improve Your Freight Transport & Warehouse Operations.

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Introduction

This article will look at a Framework for improving operations. To do this it will focus in on specific examples for freight transport and warehouse operations. The article will use various figures to illustrate the points being made, however to apply the methodology to a real operation, then the real figures will need to be used from that operation.

Analysis Framework

Improvement needs to be a continual aspect of operational management. Before starting, to do this you need to understand your current situation first. This is necessary to get to understand just how things actually work, in measurable terms.

A useful framework to adopt is to use a basic problem solving approach.

- **Where are we now?** This involves an analysis of your current situation in measurable terms. Measurements can be by quantity, time, or cost. For example with transport, the vehicle miles per gallon (time/quantity), with warehousing, the labour picks rate per hour.
- **Where do we want to be?** This involves setting clear objectives for improvement. For example, to improve the fleet m.p.g. by 10 per cent, to improve the pick rate from 150 to 170 picks per hour.
- **How are we going to get there?** This involves looking at options and methods available for improvement, selection, and then making a plan for implementing improvements.
- **How do we know we have arrived?** This involves comparing the new situation against the standard expected. For example on vehicle mpg, this was 6.1 mpg, the improvement objective standard was set at 6.71 mpg, the actual is currently now 6.52 mpg.

So, by having a clear analytical framework you can work through an improvement programme and measure, objectively, your progress.

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Let's now look at some of the Key drivers in Freight Transport & Warehousing. It will be seen that these so often centre on time – that four-letter word that we can never get enough of!

Key Cost Drivers in Transport

The major cost items are identified in Fig. 1, along with sample percentages of each item.

Figure 1 Transport Major Vehicle Cost Items (38 tonne Artic/Trailer)

<u>Fixed/Standing Costs</u>	
Wages	35 %
Vehicle Depreciation	29%
Administration and Management	23%
Vehicle Insurance	10%
Vehicle Licences	3%
<u>Total</u>	<u>100%</u>
<u>Variable/Standing Costs</u>	
Fuel	52%
Maintenance	20%
Tyres	27%
Oil	1%
<u>Total</u>	<u>100%</u>

NOTE: Wages assume using employed staff, who are "on the books"

The important aspect to realise with transport costs is that the fixed costs tick away every minute. They have to be paid whether the vehicle is working or not and whether the vehicle is moving or not!

The question to ask now, is which of the above costs are controllable on a daily basis?

The following may help:

- Wages are usually determined annually for the basic rate with overtime being a variable element for specific journeys.
- Depreciation is usually determined by Finance people and revolves around the vehicle life, a matter of years.

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- Administration and Management involves wages/salary costs plus office space/power/light/telephones etc. Again usually annually determined items, with power/light/telephone usage being a variable dependant on usage.
- Licences are fixed by Government, usually annually.
- Insurance is again an annually controlled cost.
- Fuel. The price paid will be determined on a period basis, but the usage will vary on a trip/daily basis.
- Maintenance costs follow usage and takes place at specific times (e.g. annual MOT, preventative schedules).
- Tyres and Oil will similarly follow usage rates.

So there is very little that can be controlled on a daily basis apart from fuel and the other usage costs. As fuel, is the major single cost item then that would seem to be useful to tackle?

In all of these operational improvements, you need to be able to concentrate your limited time, to that area which will have the largest impact. (Is there any real gain, by spending precious improvement time on a small cost area like vehicle insurance?).

Key Cost Drivers in Warehousing

The major cost items are shown in Figure 2.

Fig 2 Warehouse Major Costs

Labour	60%
Space	25%
Equipment	15%
<u>Total</u>	<u>100%</u>

Note:

Labour includes: wages, overtime, and all salary expenses

Space includes: rent and rates, heat, power and light

Equipment includes: fixed and variable costs for plant, racking, forklifts etc

Figure two illustrates typical figures for a 'normal' warehouse handling ambient goods, received and stored on pallets in adjustable pallet racking, with case picking by pallet truck and despatch on pallets.

It will be seen that labour costs are the largest item.

The question to ask again, is which of these costs are controllable on a daily basis?

Analysing labour costs by activity can be useful. The following is a typical view:

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<u>Activity</u>	<u>Labour cost</u>
Receiving	13%
Put Aways	12%
Picking	43%
Despatching	20%
Other	<u>12%</u>
	<u>100%</u>

As the labour cost rates (wages, overtime, all salary expenses) are usually determined annually, then the way the activities are managed and organised will need to be examined. As picking is the largest item, then this is the one we will examine further. Again, this concentrates your limit analysis/improvement time, to the area that could have the biggest 'hit'.

Key Productivity Drivers

All Companies need to measure and control their cost expenditure. But cost measurement is only one side of the coin of measurement. You also need to measure your utilisation productivity and performance. These non-financial terms must have meaning and be able to be identified by those directly involved.

It should be appreciated here, that the financial measures are always post event, whereas productivity measures are virtually pre-event in examining the way resources are used on a daily basis. In turn, these then actually determine the financial output!

It should also be appreciated that the data for measurement (by quantity, time, and cost) will already exist within the operation – it needs 'digging' out and making into useable information. Then with constant monitoring of the Key productivity Drivers (or indicators, KPI'S if you prefer), an ongoing health check and early warning of problems is available.

Key Productivity Drivers in Transport

In transport, and at the risk of stating the obvious, vehicles are expensive and only earn money when they are working. So, an analysis of this working time is important. Simply, we can see three key measures:

- 1) The Time Vehicles are Used working/ Time Available
- 2) The Percentage of Time Used Working on Journey Time
- 3) The Percentage of Time Used Working on Turnaround Time

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In the UK – a small place – then the Journey Times are relatively low. So, the Turnaround Time is often the critical item of the time a vehicle is working.

Average National figures indicate that with a vehicle 8.2 hours working day the Moving Time is 42% and Non Moving Time is 58%.

When a vehicle is working but not moving, then it is either stood in traffic or stood whilst being loaded/unloaded.

The excellent study by Alan McKinnon (The Effect of Traffic Congestion on the Efficiency of Logistical Operations in International Journal of Logistics Research and Applications Volume 2, July 1999) showed that 65% of delivery delays were due to problems at collection/delivery points, with only 18% of delivery delay due to traffic congestion.

Now which of these Key Time drivers are controllable on a daily basis by operational people?

The following may help:

- 1) Time Working / Time Available
Yes, this is, but other parties are involved on the origin and availability of work. Marketing/Sales for example in a third party operation.
- 2) Time Working/Journey Time
Yes, journey times can be looked at through re-routings, avoiding known congestion points etc. Practically, however, options may be limited.
- 3) Time Working/Turnround Time
Yes, this has to be the major one to fully examine. It has a major impact on vehicle productivity, as it is so often the major use of time.

Key Productivity drivers in Warehousing

In Warehousing, we have seen that labour is a major cost and therefore an analysis of this would seem helpful. We can see the following key measures:

- 1) The Time Used/Time Available
- 2) The Percentage of Time Used Working on Receiving
- 3) The Percentage of Time Used Working on Put Away.
- 4) The Percentage of Time Used Working on Picking
- 5) The Percentage of Time Used Working on Despatching
- 6) The Percentage of Time Used Working on Other Activity

Whilst Warehouses are compact places, time is easily eaten away. For example if one person can pick 150 cases per hour and takes an extra four steps for each pick, they travel around an extra 12000 feet in a 10 hour shift – that's around an extra 2 miles travelled each day by one person.

We have seen that Picking is the major cost item, and an analysis of the Average Picking Time could typically show that:

Travel Time	60 per cent
Pick Time	20 per cent
Looking/Checking time	10 per cent
Other time	<u>10 per cent</u>
	100 Per Cent.

Now which of these Key time drivers are controllable by operations people on a daily basis?

The following may help:

- 1) Time Used/Time Available
Yes this is, but other parties involved on the origin and availability of work.
Retail selling/trading for example in a Retailers D.C.
- 2) To 6) Time Working on Activity
Yes these are, and the percentages for each activity compared with each other
are important to establish.

As picking is the major cost item, then we will continue by focussing on this in looking at improvement options.

Basic Improvements

We have seen in Transport that:

- the Key controllable cost driver is the fuel consumption.
- the Key controllable productivity driver is the vehicle turnround time.

We have seen in Warehousing that:

- the Key controllable cost driver is the labour cost.
 - the Key controllable productivity driver is the labour picking rate
- (Note: Your Key drivers may be different, if so, what are they?)

We shall now look, briefly, into some of the improvement possibilities for these options.

Fuel consumption

There are of course many reasons for variable fuel consumption. These include:

- Route factors such as gradients, climate, road types
- Vehicle factors such as engine size, body types and tyres

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- Driver factors such as driving style, speed, personality

The first thing is therefore to ensure you measure fuel consumption per vehicle, then to challenge variances and then to Control fuel use.

There are many 'solutions' which means there is always something that can be done. Figure 3 explores this further

Figure 3 Fuel Economy-The 4 steps to Better Fuel Economy

Step One - Measure Fuel Usage per Vehicle, every week. Recognise reasons for variable fuel consumption such as:

- Route factors, (gradients, climate, road types)
- Vehicle factors, (engine size, body type, tyres, pressures)
- Driver factors, (driver styles, speed, personality)

Step Two - Challenge Variances

- Appreciate the above reasons are not " a formula for doing nothing"

Step Three - Examine Improvements

Known and tested improvements are as follows:

- Route selection & planning
- Driving training reinforcement (12 to 16% reported fuel saving)
- Vehicle maintenance/tuning (5 to 10% ü ü ü)
- Engine speed limiters (5 to 15% ü ü ü)
- Aerodynamic fittings trails (17 to 25% ü ü ü)
- Preventing theft of diesel
- Fuel efficient vehicle engines (1 to 8% reported fuel saving)
- Change the fuel supplier (1.5 to 6% reported fuel saving)

Note: some of these reported savings maybe interactive. For example, trailing aerodynamic fittings may change the driving style. Clearly, the costs of improvements will also need looking at. However, payback periods are from weeks (driver training) to less than two years (aerodynamic fittings). All on a vehicle with a life, well in excess of these periods.

Significant savings can be made here and are ignored at peril!

Step Four - Management Control

- Reinforce improvements; maintain vigilance with an effective management system. (The DETR reported 5% savings when drivers are aware that fuel costs are being monitored).

Vehicle Turnaround Time

The first thing is to measure it, (and how about using the tacograph for this?). Next is to put a cost on the time. Then, once the 'hot spots' are identified, a visit is necessary to discuss ways to avoid delays. This is unlikely to be straightforward, but by knowing objectively the time and the cost involved, suitable monitoring can be made, and more effective decision making will result.

Warehouse Picking

The first thing here, is to be able to categorise throughputs. An ABC/ Pareto Analysis will reveal the A (Fast) to C (Slow) moving products. The ideal is to place the A-items where the travel distance is minimised – (recall that travel time was 60 per cent of picking time). Other options available and shown from using an ABC Analysis may be the following:

- A/ fast items are cross docked/picked on receipt/picked by line
- B/ medium items are aisle/racked/zone picked
- C/ slow items are aisle/racked/belt picked

The principles to apply are to:

- travel less (as already illustrated)
- travel faster, for example with powered pallet trucks using low level picking
- pick several orders at once, for example batch picking
- simplify/remove paperwork checking, for example, Radio frequency, pick by light, finger scanning.

A summary of the options to use are shown in Fig. 4.

Fig 4 Picking Options

Aim: To minimise operatives travel time

Goods to operator

- carousels, either vertical or horizontal
- conveyors, pick to belt

Operator to goods

- walking with hand or powered pallet truck at low level
- picking trucks upto high levels
- zig/zag or switch travels patterns in the aisle?
- Batch pick or zone picks

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Performance indicators (Indexed picks per hour)

- Hand truck (Low level) 100
- Picking truck (High Level) 100
- Conveyor 100 to 300
- Vertical carousel 300
- Powered truck 300

Action Time

It has only been possible to give a flavour of some of the improvement options. The ones used are real enough and have been used to challenge action! (Additional improvements are shown in Figure 5 and Figure 6).

You have seen that it is possible to effect improvements by closely monitoring daily operations.

You have also seen some of the options for improvements.

What next?

Well that's down to you. Many people know and talk about improvements, but far fewer bother doing anything. Why is this? Perhaps it is because implementing improvements means change. Perhaps its because implementing improvements is often from the front end, and is visible (and is risky). Perhaps it is because they think they are doing it correctly anyway, after all, you do not know, what you do not know!

It is said there are three kinds of people when it comes to change. Those who embrace it and go with the flow. Those who disrupt it and actively go about sabotaging it. Then those (often the silent majority), who are subversive, have seen it all before when it never worked as nothing ever happened!

Implementing change in fact is very similar to the earlier Basic Problem Solving Approach. The following steps are needed:

- Evaluate the current reality (see, Where are we now)
- Envision with goals (see, Where do we want to be)
- Explore options (see, How are we going to get there)
- Establish what to do (see, How are we going to get there)
- Empower self and others, the essential communication and awareness programmes.
- Excel in the results (see ,How do we know we have arrived)

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Remember that with change, success is so about combining technical competence and peoples attitudes. Technical change is usually easier then cultural change! Once the principle of change is established however, one change will lead to another as people will then create change and will stop constraining it. Then created change will overcome the accumulation of complacency from the subversives. As has been said pagodas survive earthquakes, as rigid structures do not cope well with change. However in times of change, it is only those who will learn, that will inherit the future.

Figure 5 Transport Improvements

Labour related

- Work hours/shifts/annualised hours/ overtime
- Absenteeism levels
- MBWA (Management by walking about)
- Training &Development

Methods related

- Preloading
- Delivery frequency
- Turnaround times(Critical)
- Journey times
- Fixed routing
- Unitisation of product
- Drop size
- Performance standards
- Vehicle fill
- Scheduling
- Vehicle and Operational records

Equipment related

- Specifications
- Lease/Buy options
- Fuel economy (critical)
- Utilisation
- On board computers/communications
- Maintenance programmes

Figure 6 Warehouse Improvements

Labour Related

- Work hours/shifts/annualised hours/overtime
- Absenteeism levels
- Picking methods
- Unitisation of products
- Incentive schemes
- MBWA(Management by walking about)
- Training and Development

Space Related

- Cubic utilisation
- Variable height racking
- Standardised pallets

Equipment Related

- Batch picking/Sortation
- Scanning
- Automation
- Radio frequency
- Specifications

Process related

- Product lines/Volumes/Product obsolescence
- F/M/S, ABC analysis
- Order quantity
- Average/Peak/Low, periods- daily/weekly, monthly
- Scheduling
- Service levels
- Safety stock
- Customer Response
- Information flows
- KPI's

Summary & Final Questions

This articles has used the following framework:

- Understand the current operation first in measurable terms
- Set clear improvement objectives
- Identify the Key controllable cost and productivity drivers
- Consider various options/methods to improve operations

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- Monitor and measure improvements by utilisation performance and productivity ratios
- Effective implementation will involve combining technology with peoples attitudes

And finally.....

- What are your current measurements?
- Do they illustrate the Key cost and the Key productivity drivers?
- What is your best option for improvement?
- How will you effectively implement the improvement?

Applying and learning from some of the ideas in this article, is not about copying the "model" Rather it is up to you, maybe with some help, to create your own learning as you go. This learning will need to be based on you own company, its methods, its problems, its markets and certainly not the last, its people. What is needed above all else, is a willingness to learn, to improve, and to change.

References:

- Logistics Training International various reference manuals
- Alan McKinnon (The Effect of Traffic Congestion on the Efficiency of Logistical Operations in International Journal of Logistics Research and Applications Volume 2, July 1999)