How to reduce the cost of improving services and make improvements more likely

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Contents

1. The benefit of cutting journey times,

- How it cuts costs e. g. Nottingham – Leeds
- How it could help increase frequency e.g. Nottingham – Lincoln
- How it could increase capacity e.g. MML
- How it helps punctuality e.g. RHL

2. How it can be delivered – relatively cheaply !

Nottingham and Leeds…..

Are 2 of England's 8 Core (i.e. biggest) Cities
(the others are Bristol, Birmingham, Manchester, Liverpool, Newcastle, & Sheffield)

- are 82 miles apart;
- the service is hourly ;
- and the journey takes 2 hours (= 41mph)
- This is slower than most other InterCore-City services

What would be the biggest benefit of cutting the journey time by 20 minutes ?
(making it = 48mph)

Nottingham - Leeds

Leeds	depart	xx.00
Nottingham	arrive	x2.00
Layover		
Nottingham	depart	x2.15
Leeds	arrive	x4.15
Layover		
Leeds depart		x5.00

So an hourly frequency at 1 hour 59 minutes **needs 5 diagrams** (i.e. 5 units plus crews)

Nottingham - Leeds

Leeds	depart	xx.00	xx.00
Nottingham	arrive	x2.00	x1.40
Layover			
Nottingham	depart	x2.15	x2.00
Leeds	arrive	x4.15	x3.40
Layover			
Leeds depart		x5.00	x4.00

So an hourly frequency

- at 1 hour 59 minutes needs 5 diagrams
- **at 1 hour 40 minutes needs only 4 diagrams**

What effect does this have ?

- Traditional focus is on patronage growth
- **But the biggest potential benefit lies in reducing costs**

Saving from the reduction by 1 unit

vehicle hire	(2-car Sprinter)	£ 200k
Drivers	(4 per unit)	£ 200k
Conductors	(4 per unit)	£ 120k
Total saving		**£ 520k**

These numbers are approximate

- The unit costs are averages provided to NR by DfT
- In the RUSs Network Rail has been guided by the TOCs to multiply the number of unit diagrams by 4 to identify the number of drivers and conductors required to work them for 'all day services' on a 6 or 7 day operation, to take account of Physical Needs Breaks within the traincrew diagrams, and Rest Day and other relief cover arrangements.
- **"The actual number of traincrew saved and the values quoted for all costs above may differ markedly"**. The TOCs have not indicated to NR in RUS working groups etc whether the figures provided by DfT are close (or not) to the rates they have to pay!

This works in quantum steps

The speed-up needs to be sufficient to cross the threshold at which a service be operated with one less unit

Exact figures

- depend on length of journey time,
- Frequency of service
- Which combine to determine number of diagrams
- And subject to pathing constraints

But the effect is usually far bigger than any other single saving an operator could make

Nottingham – Leeds

Is straightforward

The speed-up is the objective

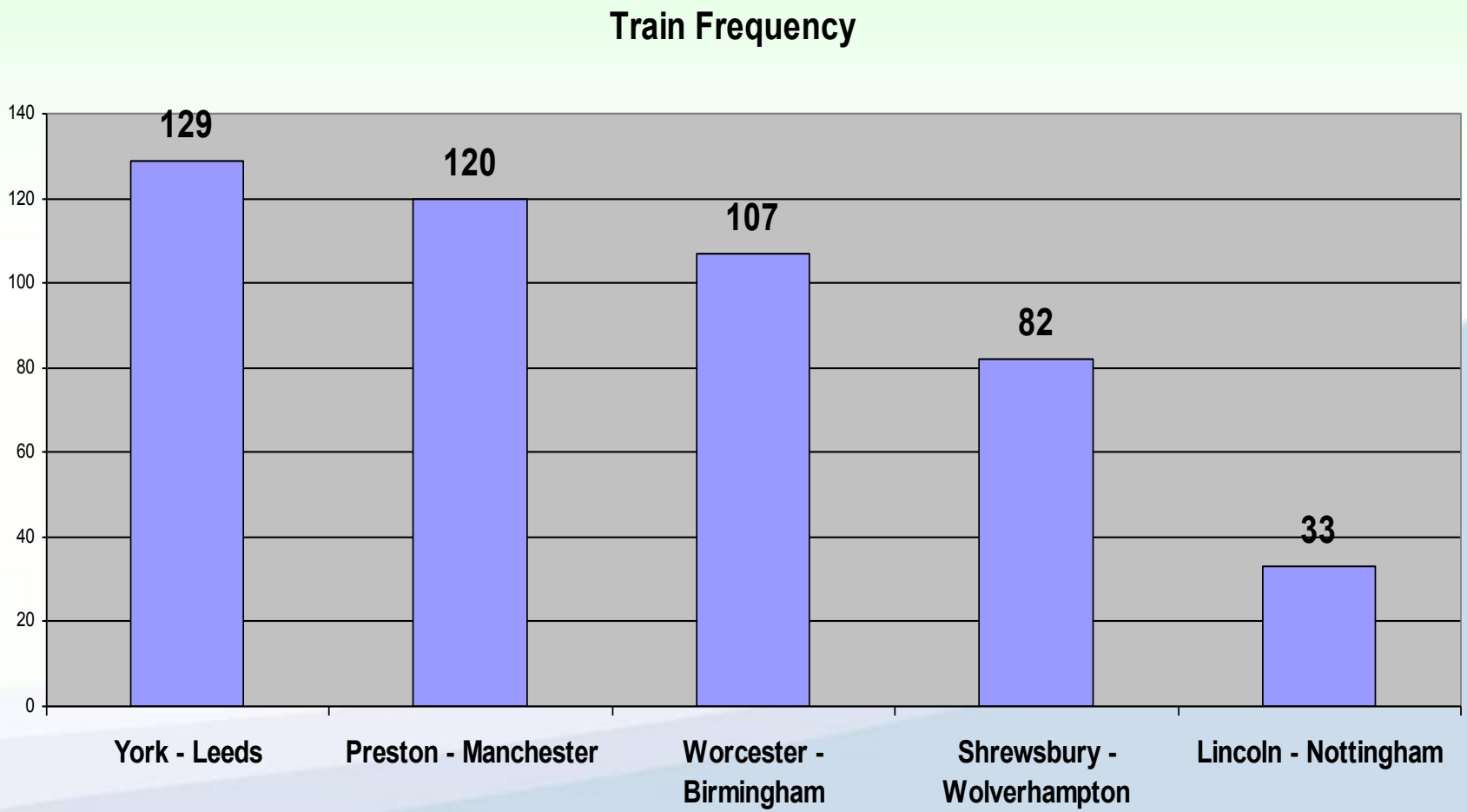
The unit saved can be redeployed by Northern for use elsewhere

But there are variations on this benefit

- It could be a big step towards increasing frequency
  e.g. Nottingham – Lincoln,
- Or can free up a unit to strengthen overcrowded services e.g. MML
- At the least it can help punctuality e.g. RHL
- And could reduce the revenue costs of re-openings !

How a speed-up could help enhance frequency e.g. Nottingham - Lincoln

Nottingham – Lincoln currently just 1 per hour



Nottingham – Lincoln journey times

Nottingham	depart	xx.00
Lincoln	arrive	xx.52
Layover		
Lincoln	depart	x1.00
Nottinghamarrive		x1.52
Layover		
Nottingham depart		x2.00

So the current hourly frequency needs 2 diagrams under both journey times

Half-hourly would need 4 diagrams – **an extra 2**

Nottingham - Lincoln

• Nottingham	depart	xx.00	xx.00	xx.00
• Lincoln	arrive	xx.50	xx.40	xx.35
Turnround				
• Lincoln	depart	x1.00	xx.50	xx.45
• Nottingham	arrive	x1.50	x1.30	x1.20
Turnround				
• Nottingham	depart	x2.00	x2.00	x1.30

So a half hourly frequency

- at 50 & 40 minute journey time needs 4 diagrams
- **at 35 minutes it only needs 3 diagrams – just one extra unit to double the frequency**

Cost of Nottingham – Lincoln

Extra units required → →	**1 unit**	**2 Units**
vehicle hire (2-car Sprinter)	£ 200k	£ 400k
Drivers (4 per unit)	£ 200k	£ 400k
Conductors (4 per unit)	£ 120k	£ 240k
Fuel (30p per vehicle mile)	£ 94K	£ 94k
Variable track access charge (5p per mile)	£ 16K	£ 16k
Maintenance (70p per mile)	£ 220K	£ 220k
Total	**£ 850k**	**£1370k**

reduces cost of doubling service by 38%

= £ £520,000 per annum

15 round trips per day x 67 ½ miles x 310 days (Mon – Sats inclusive) = 313875 miles per annum

So speeding Nottingham - Lincoln up by 17 minutes

So speeding Nottingham - Lincoln up by 17 minutes

- Cuts operating cost by £520,000
- Generates increased revenue of circa £660,000

Reduces need for subsidy

by around £1.2 million per annum

How a speed-up could increase capacity e.g. MML

MML has 125mph trains but no 125mph track !

- Nottingham – London takes 101 minutes
- Sheffield – London takes 127 minutes

If 125mph track, then journey times could be

- Nottingham – London 90 minutes
- Sheffield – London 115 minutes

Saving 11 or 12 minutes per journey

Overall time saving

There are 10 MML trains per hour (5 each way)

- 4 to/from Sheffield
- 4 to/from Nottingham
- 2 to/from Corby

- So total time saving could be
- 4 x 12 minutes for Sheffield trains = 48 mins
- 4 x 11 minutes for Nottingham trains = 44 mins
- 2 x 2 minutes for Corby trains = 4 mins

Total saving = 48 + 44 = 4 **= 96 mins every hour**

What use are these savings

- 12 minutes or less not usable individually
- But if paths could be flexed – a big ‘if’ – then the savings could be aggregated to the full 96 minutes
- And it might be possible to utilise some current turnround time e.g. 55 minutes at Sheffield by semi-fasts
- Could total over 120 minutes per hour – which could free up 2 units

Sheffield arrive xx.52, depart x1.47

What use are two Meridians

- Not enough to enhance regular hourly pattern

But could

- Provide enhanced timetable for peak flows
  i.e. to London am peak, from London pm peak

And/or

- Strengthen selected overcrowded trains throughout the day.

This is the only way to make 125mph diesel trains available – there is no other realistic source

How a speed-up can improve punctuality e.g. Robin Hood Line

In 2002 RHL had worst PPM of any route in England – just 52% of trains on time over the year

Including approx 15% cancellations !

- Fixed slots into/out of Nottingham
- Long single line section
- Tight turnrounds – 3 minutes at Mansfield Woodhouse & 7 minutes at Worksop

Robin Hood Line (RHL) scheme

Notts CC scheme with NR to raise speeds

- Sutton Forest – Mansfield 40mph ➔ 60mph
- Mansfield Woodhouse – Littlewood 20 ➔ 50mph

Has saved

- Sutton Forest – Mansfield 1½ minutes
- Mansfield Woodhouse – Littlewood 1½ minutes

That has increased ‘working timetable’ turnrounds

- 3 minutes ➔ 6 minutes at Mansfield Woodhouse
- 7 minutes ➔ 13 minutes at Worksop

MORE TRAINS ON TIME!

Official data now shows that East Midlands Trains is running more trains on time

Punctuality is measured through a Public Performance Measure (PPM) recording the percentage of passenger rains arriving at their destination and within a specified lateness margin (typically five or ten minutes). This measure captures all delay causes (Network Rail, train operators and others).

GET ON BOARD.
EAST MIDLANDS TRAINS

Further scheme

A second phase is in hand to raise speeds at north end of the line

- Littlewood – Shirebrook 50mph ➔ 60mph
- Whitwell – Woodend Junction 60mph ➔ 75mph
- Woodend jnc – Shireoaks East 20 ➔ 50mph

To save a further

- Littlewood – Shirebrook - ½ minute
- Whitwell – Woodend Junction -½ minute
- Woodend jnc – Shireoaks East - 2 minutes

The benefit

- Could raise Worksop turnrounds to 20 minutes
- Almost enough to extend to Retford
- But that would re-introduce vulnerability to delay !

Could this help a re-opening ?

e.g. Borders line (about which I know very little !)

- 35 miles Edinburgh – Tweedbank
- 7 new stations
- Needs at least 10-minute turnround at each end

For an hourly service

- If below 50 minutes (= 42mph) then needs two units & crews
- If more than 50 minutes (= under 42mph) then will need 3 units & crews
-

50 minutes Journey time critical threshold

- 42mph or more saves a unit & crew
- Less than 42mph and it needs an additional unit & crew

- If 2-car, then cost = circa £520k per annum
- If 3-car then the cost difference is circa £720k per annum

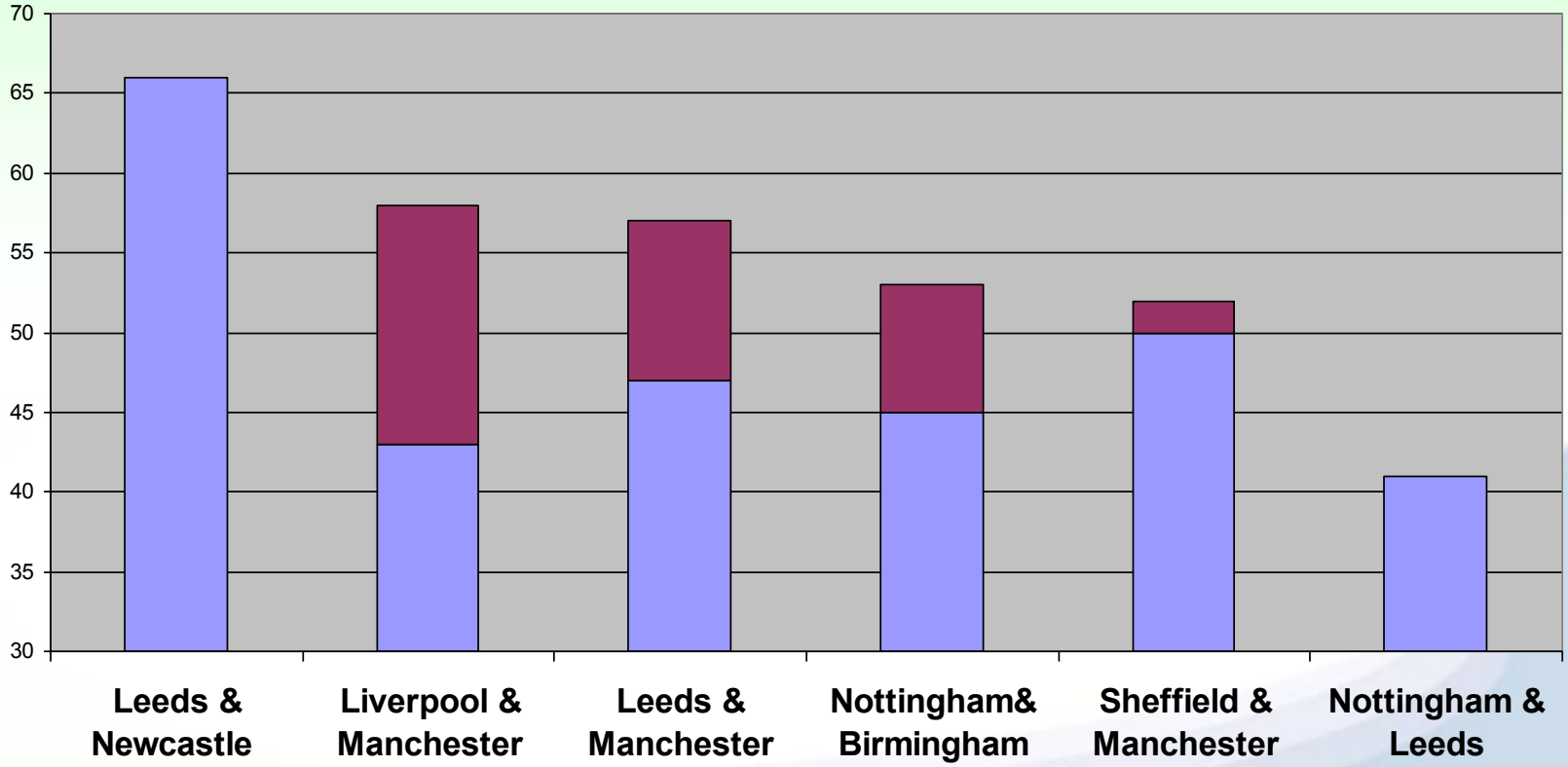
- **This is routinely achieved elsewhere**
- Inverness – Aviemore: 56mph (35 miles in 37 minutes)
- Inverness 12.54 – Aviemore 13.31, or Inverness 14.51 – Aviemore 15.28

Are such increases realistic ?


20

Cost just £360,000

- Minor works on 2 bridges
- several thousand tonnes of ballast,
- and 2 runs over it with a tamper (in 1 single possession)


70
65
60
55
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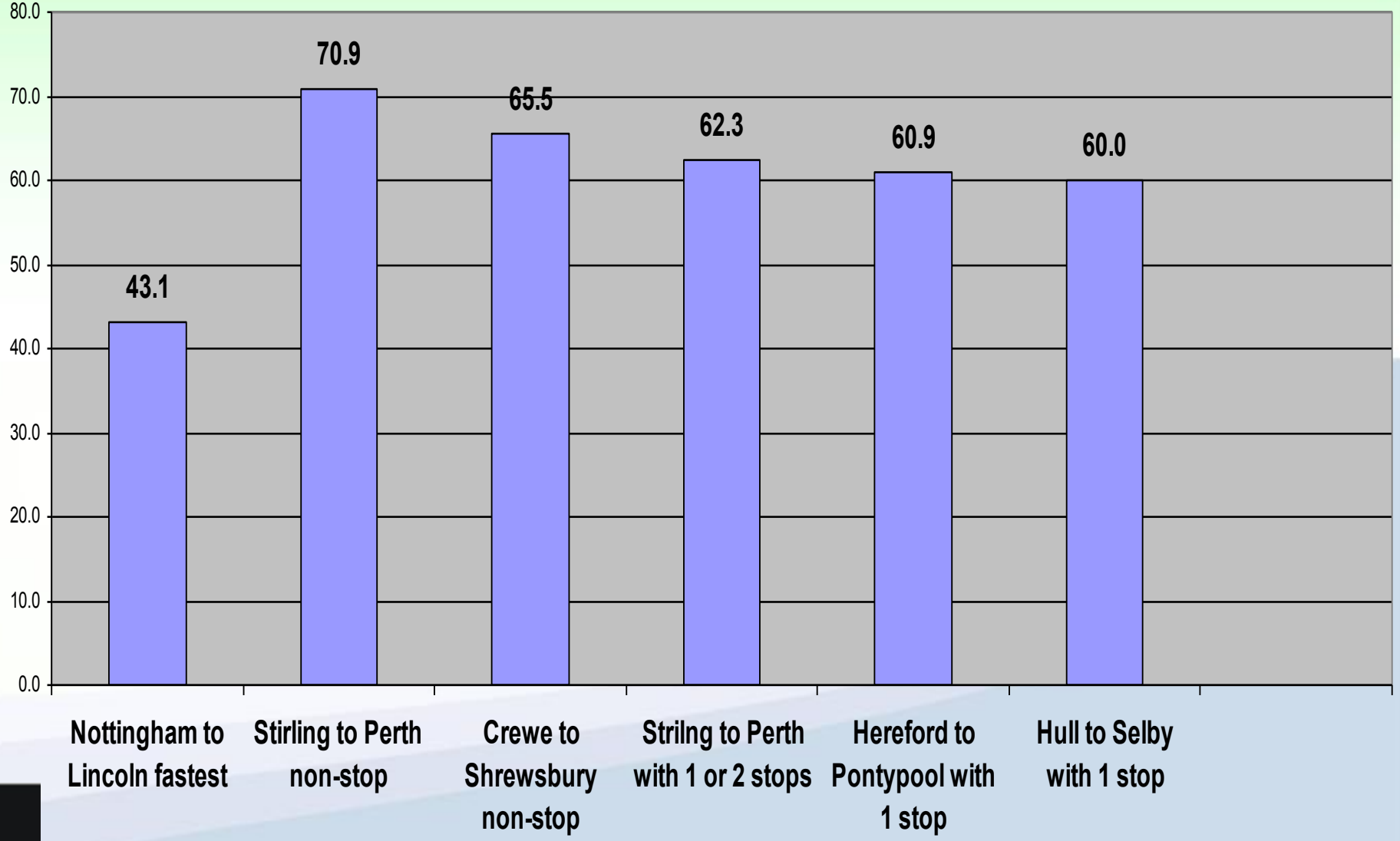
Leeds & Newcastle
Liverpool & Manchester
Leeds & Manchester
Nottingham& Birmingham
Sheffield & Manchester
Nottingham & Leeds

Average speeds of comparator services



Comparator times

	distance (miles)	time taken (minutes)
Stirling – Perth	34¼	33
Hull – Selby	31	31
Crewe – Shrewsbury	32¾	30
Hereford – Pontypool	33½	33
Nottingham – Lincoln	33¾	52 - 70

So, it should be possible

- Lincoln - Newark in 18 – 20 minutes
- Newark - Nottingham in 17 - 19 minutes
- Lincoln – Nottingham in 35 minutes

Distance to London

Distance

Time

MML Linespeed Improvement – what can be done

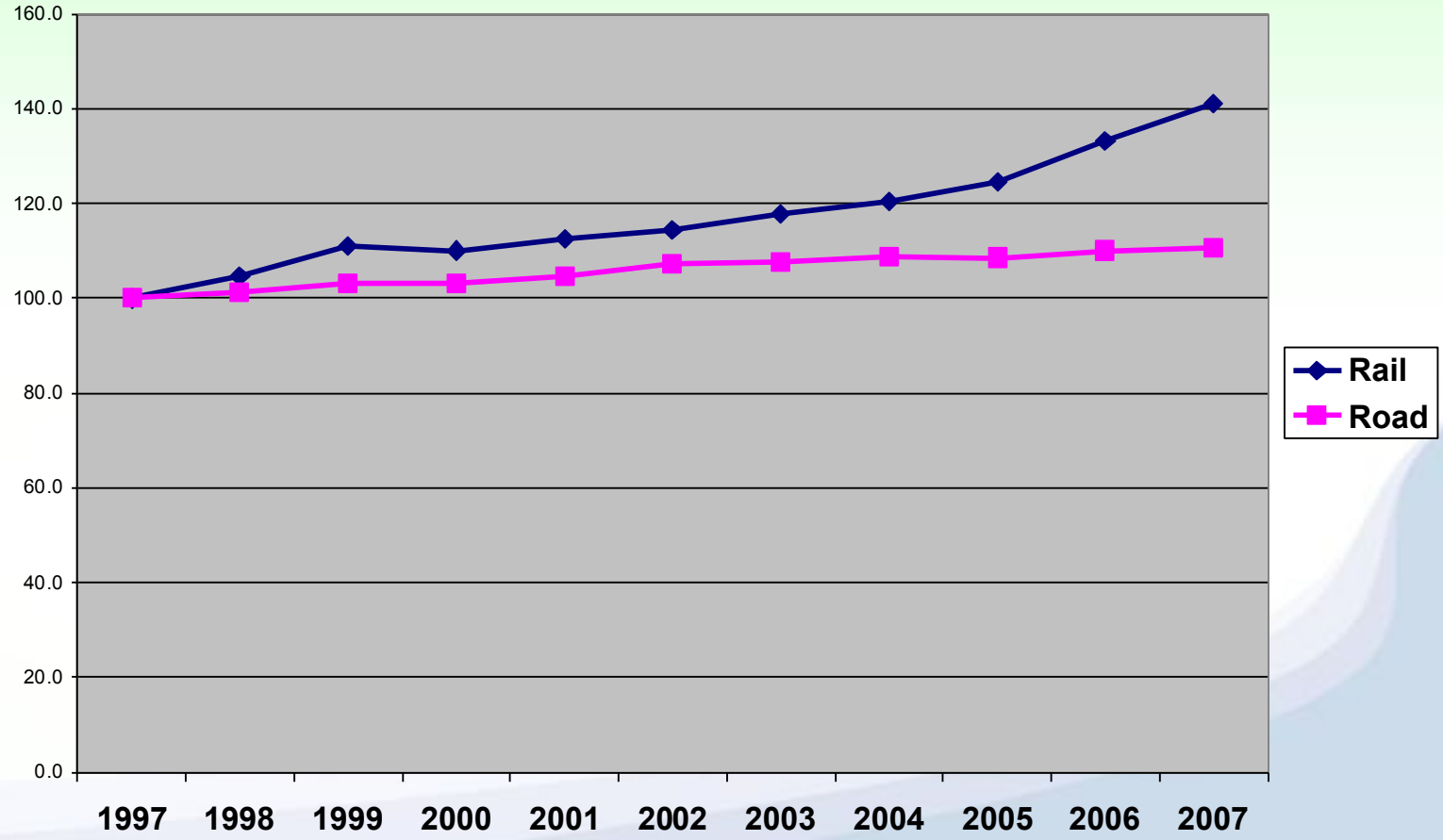
Finishing a job started in 1978

MML Linespeed Improvement – excellent vfm

- MML has half the passengers of WCML, and
- Journey time saving 8 mins MML vs 20 mins WCML
- So 40% the benefit to half the passengers
- = 20% of the total benefit
- But for just £69m
- Compared to £2bn ? for the WCML

I am convinced it will come to be seen as an exemplary way to upgrade existing lines

Rail vs road passenger km growth 1997 - 2007



In summary

Notts is taking full advantage

- Nottingham – Lincoln
- Nottingham – Sheffield – Leeds
- Nottingham – Birmingham
- Sheffield – Worksop – Lincoln
- Nottingham – Grantham - Skegness

Revenue effects

- Guesstimate 500,000 passengers per annum
- Guesstimate Revenue = £2 million
- 'Sparks Effect' rule says 1% rise in patronage & revenue for every 1% reduction in journey time

So

- 52mins ➔ 35 mins = 33% reduction
- Which should generate 33% more revenue
- **= £ 660, 000 additional revenue**

- NB – further additional patronage and revenue would arise from increased frequency, but that element is common whatever the journey time and number of units