

LIPS2015 Barcelona

Lean in Public Sector Construction Conference

Session 3

Lean in Transport for London

Enabling Construction to Production

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#LIPS2015
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Enabling Construction to Production

- **What is TfL**
- **Productivity drive in the UK Public Sector**
- **How we traditionally 'do' improvement**
- **What we did - 3 brief case studies**
- **A public sector view of motivation**
- **What we will do next & why this works**



Transport for London (TfL)

- Operates the public transport network in London
- Moves a population the size of Sweden every day
- 2004 26.6 million Journeys a week
- 2013 30.6 million Journeys a week
- Tube 2003-2013 34% increase in journeys
- 10% of UK contactless payments are on our network



'Productivity is the challenge of our time'

- **Fixing the foundations July 2015:**



Fixing the foundations:
Creating a more prosperous nation

Handwritten signature of George Osborne in black ink.

George Osborne
Chancellor of the Exchequer

July 2015

Handwritten signature of Sajid Javid in black ink.

Sajid Javid
Secretary of State for Business, Innovation and Skills

July 2015

Presented to Parliament by
the Chancellor of the Exchequer
by Command of Her Majesty

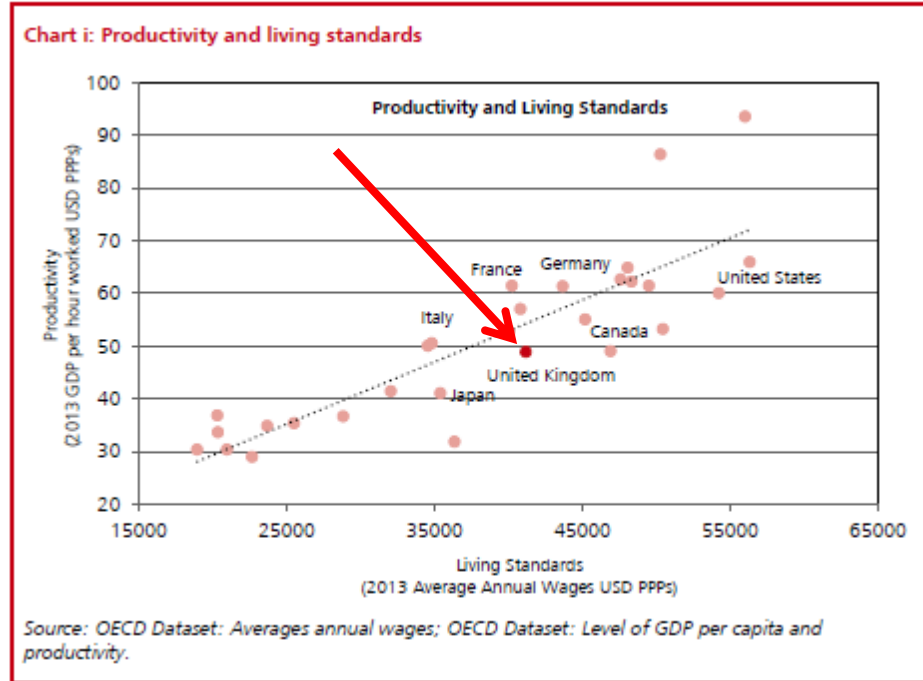
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Cm 9098



‘Productivity is the challenge of our time’

- UK productivity 17% behind G7 average



Fixing the foundations – new leverage?

- UK productivity 17% behind G7 average
- The Dowling Report – collaboration between Industry and research
- ‘Cut a further £10billion red tape’
- Innovation equally applies to the entire value stream – we can innovate in other ways which challenge the status quo



CSR, TfL funding & Construction 2025

- **Comprehensive Spending Review**
- **Move towards self funding**
- **C2025 daunting targets:**
 - **33% lower cost than today**
 - **50% faster from inception to completion**

“Unless we double productivity we won’t have the supply chain to cope”



How do we approach productivity improvement in the public sector?

A personal reflection: HMS Coventry



Personal reflection: Seawolf reloading

Training
Standard
Time



Fleet
Standard
Time



Practice
Practice
Practice

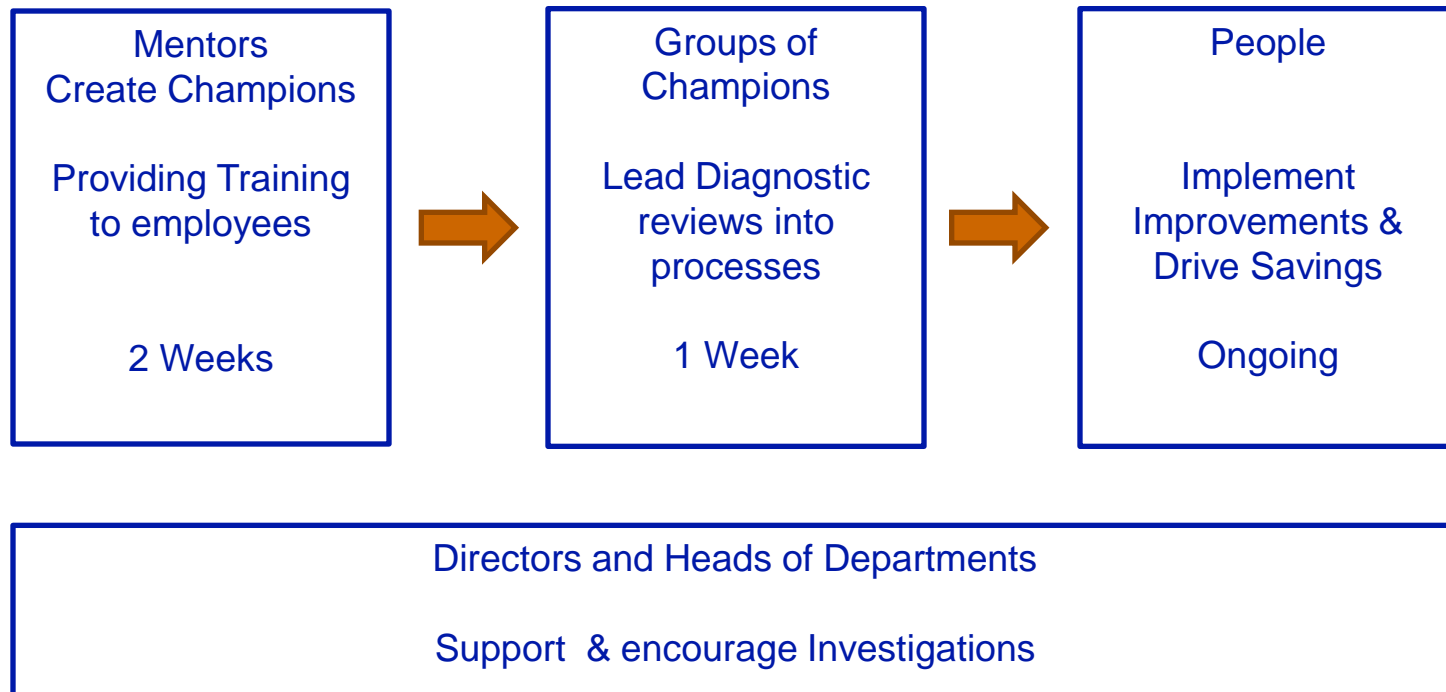
Personal reflection: HMS Kent



Personal reflection: Waste removed the public sector way



How we initially deployed this



Case Study 1

Notice Of Works Ready for Inspection

(NOWRI)

“your bathroom is finished now”



Lean Breakthrough Event Title:- Reducing waste within the inspection Process



From L - R
 Richard Burton
 Chris Barrett
 Jag Chima



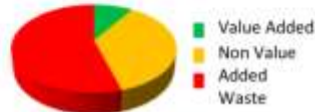
1. Background and reason for event

It was Senior management's original belief that we needed to focus on why the project teams were waiting too long for inspectors. The executive team originally put this down to a shortage of engineers. Our event focused on understanding the reasons why inspections were not passing first time and to find solutions to the root causes of those issues rather than throwing extra people at the problem.

2. Current state diagnostic

Analysis of the current NOWRI process showed us that there were:

- 22 Steps in total
- 2 are Value Added
- 8 are Non Value Added but Essential
- 12 are Waste



3. Current State Quantification

Key quotes about past NOWRI process:

- "I'm waiting too long for inspectors"
- "Engineering are blocking the project's progress"
- "Engineering aren't interested!"
- "Someone else will check this, I don't need to!"
- "Nothing to do with me, this is engineering's problem!"

Total Process Cost
Original (2010)
 Engineering Hours:
 £3,300,000
Waste - £1,891,000

4. Goals, SMART targets

- To increase the amount of 1st time green NOWRI's for 2011
- To gain buy in from all stakeholders to the revised NOWRI process and roll out modified process to the rest of the business, initially via the Asset stabilisation programme
- To move responsibility for inspections back to site team and contractors

5. Key waste areas / Root cause analysis

Key Wastes

- Too many inspections being carried out on small elements of work
- Lack of ownership from the site team, relying on Discipline Engineer's and Lead Discipline Engineer's to snag
- Checks not carried out properly by the site team
- Excessive Number of people attending NOWRI inspections who aren't adding any value

Root Causes

- Overall plan at site not fully understood leading to scheduling issues with NOWRI checks
- No financial penalties on subcontractors for failed NOWRIs
- No accountability or repercussions at site for lack of inspection at Project Engineer level
- "Someone else will check mentality"

6. Actions / solutions to root causes

Root Cause	Action solution	When	Who
1. No responsibility at the site for quality of work	Increased seniority of attendees at each NOWRI revisit (up to VP level)	2/11	JC
2. NOWRI process not clear to all, many work arounds currently in place	Firm up NOWRI process through removal of amber status and stop reclassifications	12/10	RB
3. LDE's only involved at NOWRI stage of the project	Greater LDE support throughout the project and support from senior engineering team	11/10	RB

7. Process confirmation

Period confirmation of NOWRI status against plan during regular engineering review. Consultation with Graeme Shaw and other stakeholders to develop KPI's inline with Business needs

8. Did we achieve our targets

- Key Performance Indicator review began in February 2011
- Current trends show there is an improved proportion of successful NOWRI's
- Reduced number of cancelled inspections

9. Quantified Benefits

Improved Process Cost
 In Eng Hours: £1,305,400
 Elimination of Elemental NOWRI: £511,750
Saving from original process - (Annual £1,817,150)
(£16,354,350 over 9 years)

- Additional Benefits**
- Engineers now have more time to engage in early in the day activities for general operations
 - Earlier capture of issues which will reduce the level of on site re-work
 - Behavioral changes are taking place as witnessed by the increase in number of snagging reports issued on time

Case Study 2

NEC Contract Compliance - Asite

“you bite me, I bite you back”



New Engineering Contract (1993)

- Collaborative contract
- Stipulated times to reply to communications – if you miss the deadline, the communication is assumed agreed
- Drives swift decision making, reduces confusion
- Enables all parties to work to the same aims
- We have been using this for **22 years** so it should be working well...



...What they actually found

49 Overdue Project Manager responses to Contractor's Notifications of Compensation Events

64 Overdue Project Manager responses to Contractor's quotations

536 Overdue quotations from Contractors to Project Managers



649 large items

AGREED



Lean Breakthrough Event Title:- A-site compliance managing NEC contracts



From L – R
 Kevin Walker
 Jacqui Picot
 Daniel Agutter



1. Background and reason for event

The current perception within CPD is that Project Managers are not using A-Site correctly to manage NEC Contracts. This exposes CPD to major litigation risk from contractors in the future.

2. Current state diagnostic

Analysis of A-Site Statistics at 16/11/10:

- 81 overdue responses to contractor NCE's
- 91 overdue responses to quotations
- **Only 6% of contracts had accepted programmes**

3. Current State Quantification

The data found shows that we are not administering NEC contracts compliantly. Whilst the costs associated with this are highly subjective it is clear that the business is leaving itself exposed to a significant risk through:

- Uncertainty of final accounts, EFC confidence and risk/contingency release
- Poor claims defence and costs associated with discovery and arbitration
- Recovery of damages and impact on interfacing stakeholders

4. Goals; SMART targets

- We will understand the actual problem with NEC contract adherence and identify the root causes.
- We will then investigate improvement opportunities to reduce back log of A-Site responses and improve NEC contract adherence

5. Key waste areas / Root cause analysis

Root Causes

1. Lack of reporting visibility - PMs and SPMs currently do not receive A-Site status reports
2. Consolidated headline graphs reduce individual accountability
3. Sharp increase in overdue responses on A-site during absences
4. Lack of clarity regarding acceptable programme formats
5. E-mail prompt use is sporadic and inappropriate at times
6. Consequences of contract non compliance uncertain and in the future
7. Administration of NEC contract considered too burdensome for low value works
8. Lack of LU response to contractors NEC non-compliance undermining whole contract process

6. Actions / solutions to root causes

Root Cause	Action solution	When	Who
1. Lack of NEC contract knowledge and training	Training sessions arranged and comms briefing planned	14/01/11	KW
2. Reporting process not aligned to business needs	Adjust report distribution and modify content	07/01/11	JP
3. Lack of focus within business monitoring devices such as PRIM etc	A-site overdue responses to be reviewed at PRIM's. New PPR form to include over due responses	07/01/11	DA

7. Process confirmation

- Monthly NEC contract and A-Site compliance on a project by project basis during the PRMs.
- Weekly visibility issue in the Vis Boards identified and taken forward by another LBE.
- SPM Reports distributed weekly.
- Training arranged for NEC and A-Site.

8. Did we achieve our targets

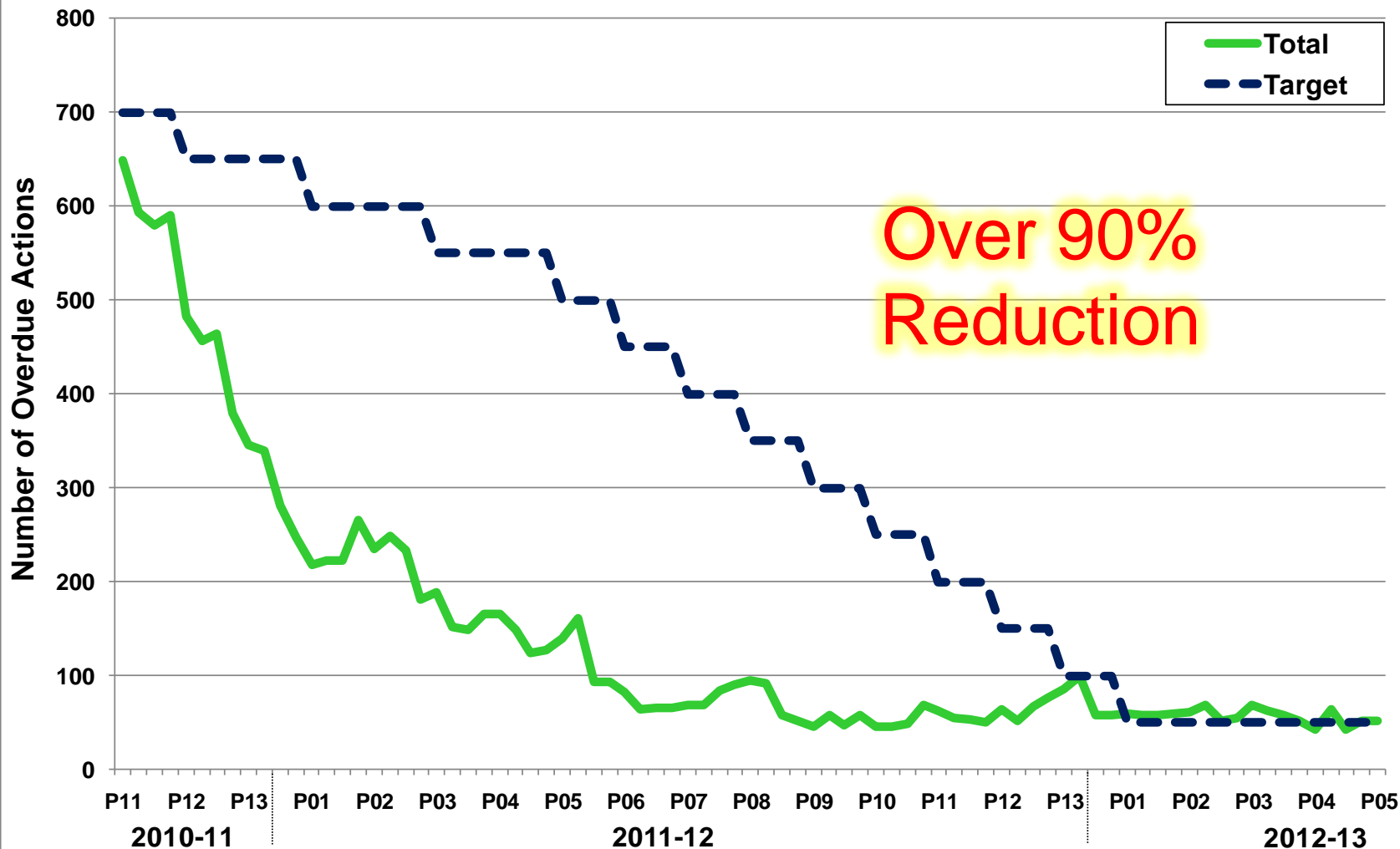
- Post LBE:
- 40 % reduction in overdue responses to contractor NCE's
 - 30% reduction in overdue responses to quotations
 - Increased awareness, clarity and appropriate prioritisation reducing business risk.

9. Quantified results and Learning points

- Effective process confirmation within stations delivery programme to ensure alignment between senior managements objectives and PM's focus
- These improvements visualise CPD's clear and meaningful KPIs that will ensure NEC contract adherence
- Improved EFC certainty and improve risk/contingency release opportunities
- Standardisation of contract admin to enable full identification of waste within the actual process

This Lean Breakthrough Event is enabling a cultural change within CPD whereby none adherence to NEC contractual processes is no longer an accepted practise. This will mitigate the risk of a multi million pound legal dispute in the future

Overdue A-Site Actions



Case Study 3

Escalator Anchoring

“make sure it doesn't move”



Lean Breakthrough Event Title:- Escalator anchoring requirements



From L-R
 Mike Row
 William Mumford
 Sheldon Kartreiber
 Guy Barker
 Martin Howard



1. Background and reason for event

The specific task that we are investigating is the anchoring of a escalator to enable scaffold erection between two escalators, or an escalator and a fix point other than the escalator. This is currently done to enable works above the escalators. The cost and time associated with these works is considerable, this team is investigating the reasons behind this process and whether it should continue.

2. Current state diagnostic

Our comprehensive investigation of the current condition shows the Maintainer is requested to anchor the escalator(s) when any work above the escalator is required. The team can find no standard or any evidence to support that this procedure is mandated and one of our major competitors, Tubelines, has already ceased this procedure through site based risk analysis. We can find is no evidence of an H&S reason for continuing this process.

3. Current State Quantification

Oxford Circus station Mods:
 Cost = £1,064.22 / night
 => 167 times
 => **£177,726 / Year** ('08/09)

Cost due to time lost during Anchoring:
 => 30min on + 30min off
 => 1h / night for 3men gang @£50
 => £150 / night x 167 times
 => £25,050 /year



Our current state process map shows only 7% of the current 'Anchoring' process provides value for the project manager

4. Goals, SMART targets



Our target is to identify the reasons why anchoring is currently an accepted procedure within stations projects and to fully ensure that this activity is required and provides value for money for the tax payer

5. Key waste areas / Root cause analysis

Key areas of concern:

Throughout our LBE interviews and process analysis we have identified several reasons given for why the anchoring process is currently required:

- "We have to do this to cover ourselves as brakes will fail due to lack of maintenance"
- "We have always done it this way"
- "The escalator cannot take the weight of the platforms on it's own"

The LBE team has not been able to find any direct evidence of these concerns actually happening during recent recorded memory

Root cause
 This activity is seen as a "belt and braces" safety measure which provides a 3rd level of redundancy for escalator safety / braking systems. The additional cost has become the norm and hasn't been formally challenged for some time

6. Actions / solutions to root causes

Root Cause	Action solution	When	Who
Brakes will be poorly maintained and not effective	Site based risk assessment will be completed	16/01/12	MH
This is the "traditional" accepted way of doing things	Full communications package detailing reason for not anchoring	03/02/12	SK
Perception that escalators won't support weight of platforms without anchoring	Sharing of current standards detailing the optional nature of anchoring	03/02/12	GB

7. Process confirmation

This process will be confirmed by the following:

1. Monthly meeting with 'Heads of department' to understand the take up of the new process
2. Monthly meeting (during night shift hours) with CSM's to gather usage data regarding escalator anchoring
3. Inclusion of LBE findings into the next quarterly newsletter

8. Did we achieve our targets

Success for this LBE team will be reducing the number of escalator anchoring for spanning works by 90% by the start of the new financial year (Apr '12). This will ensure the team realise the significant time and cost savings identified

9. Quantified results and Learning points

Quantified findings:
 We have calculated savings on next 11 (over 71) refurbishment stations.
 Based on values calculated for Oxford Circus £1064.22/night, in 167 occasions = £178k/year (Apr 08 – Apr 09)

The lack of anchoring will save £859,000 with an additional £111,000 of labour completed during the time saved
£970,000 per year

Learning points:
 "Learning how to change processes is a challenge. But with team work we will change attitudes."
 "With clear process mapping and visualising problems we can voice our opinions"

Motivation – are we working against ourselves?

MIT Research (Federal Reserve bank of Boston) 2005

- Tested the supposition that extrinsic motivation (reward) leads to improved performance
- Higher reward actually lead to worse performance for cognitive work
- If the incentive is then removed, motivation drops to below the pre-incentive level
- Yet we use performance related pay to ‘motivate’
- But does research tell us anything more?



Motivation in the Public Sector – research says we are we different

- For public sector workers, if extrinsic reward is offered for an activity we are intrinsically motivated to do, it creates a motivational clash
- If the reward is not sufficient to overcome reduction in our intrinsic motivation, both our effort and motivation decline
- Perception of the locus of control – Edward Deci, University of Rochester 1971
- Autonomy, Mastery, Self-Purpose
- Understanding that motivation will allow us to tap into hidden capacity



Revised TfL approach

- **Change our view from construction to production: view all our systems in that way**
- **Build our internal productivity improvement capability & deploy cross silos**
- **Grow knowledge and experience – MSc Thesis**
- **Support and share best – community of practice**
- **Drive a Paradigm shift..“What would it take to”...**



Paradigm Shift

- Great fire fighters
- When we have the time we focus on **Explain & Guarantee**, rather than improve
- Change the learnt response to waste – Apollo 13
- Focus on ‘why’ without conflict, mapping the process, show the waste, make a bit better
- Seeing waste becomes positive, denying or hiding waste becomes pointless



Paradigm Shift

- **Essential to learn from other innovators and create a community of practice outside TfL**
- **Shared experiments (successes and failures) will drive UK construction productivity**
- **Deliver a client that understands more, accepts our part in leading productivity improvement**
- **TRUST ME THIS WORKS OUTSIDE TOYOTA**



2004 Olympic Games – Athens

Men's 4 x 100m relay

Great Britain

Gardener	9.98
Campbell	10.04
Lewis-Francis	10.04
Devonish	10.06

The United States

Gatlin	9.77
Green	9.79
Crawford	9.88
Miller	9.98

40.12 seconds vs **39.42** seconds



2004 Olympic Games – Athens

Men's 4 x 100m relay

.....7.11m behind



2004 Olympic Games - Athens

How can they win?



2004 Olympic Games – Athens

Men's 4 x 100m relay

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40.12 seconds vs **39.42** seconds



2004 Olympic Games - Athens

How can they win?

~~Run faster~~

Concentrate on where they could add value

Baton exchange

- **Won** by 0.01s



Investment & belief

- **We need to invest to create capability**
- **We need to believe before we invest**
- **We need to be prepared to speculate (fail) to accumulate (improve)**
- **Our role is to awaken curiosity and permit experimentation**
- **Like the 4x100m team..we will finish earlier**



Questions?

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