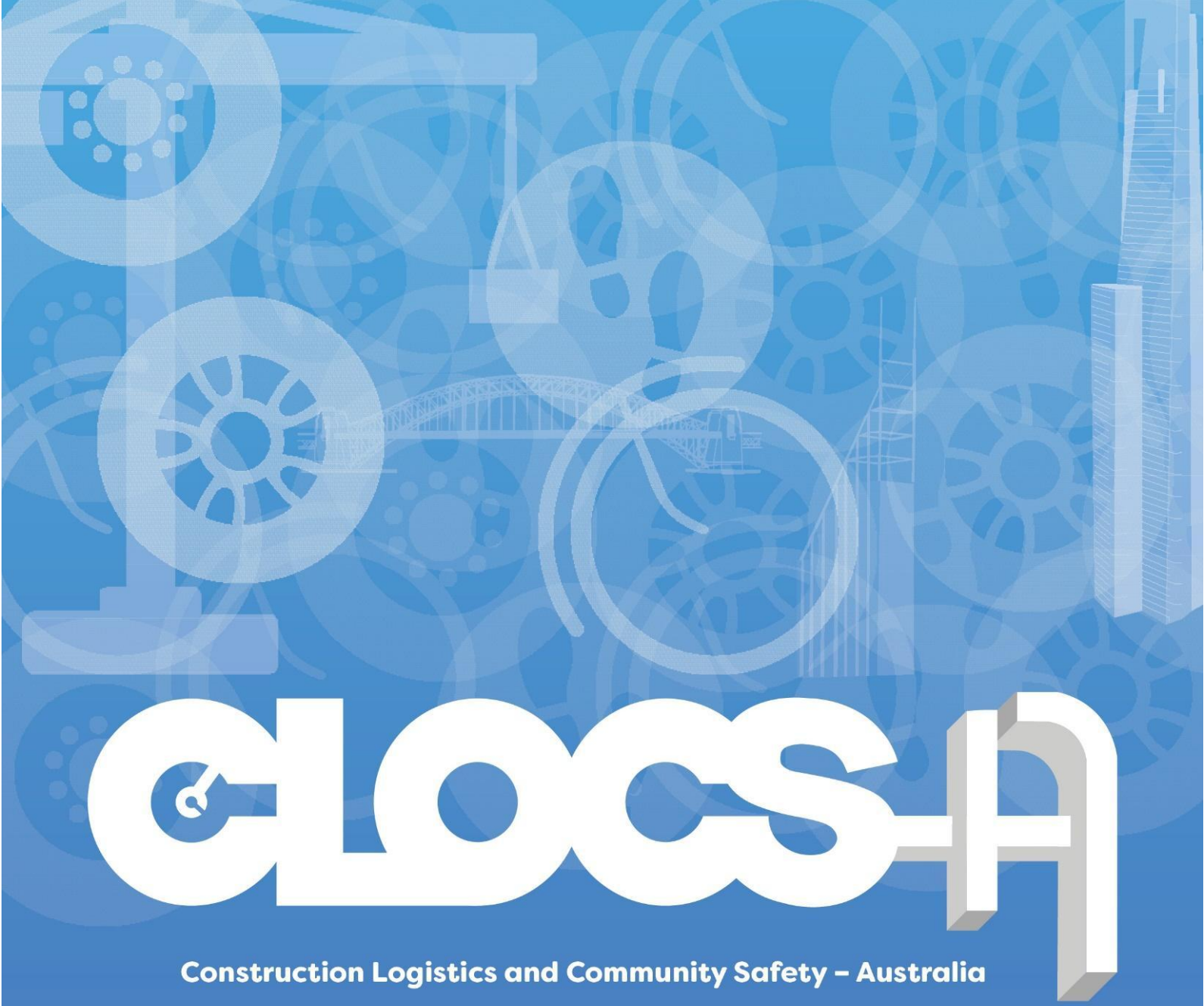

CLOCS-A

Construction Logistics and Community Safety – Australia

Standard Logistics and planning guidance

CLOCS-A STANDARD

Logistics and planning guidance

CONSTRUCTION LOGISTICS AND COMMUNITY SAFETY – A

PART A - THE STANDARD

Overview of what the CLOCS-A Standard intends

The primary aims of the CLOCS-A Standard is to protect the public from harm and to improve the quality of construction logistics planning. It provides a quality assurance mechanism that tests whether relevant systems are in place to ensure that expected standards of safety and sustainability are met.

CLOCS-A is a national construction industry standard developed to ensure the safest, leanest, and greenest construction vehicle journeys. It follows on and is based upon CLOCS in the UK. CLOCS–A is the Australian evolution of the UK model. The primary goals are:

- Zero collisions between construction vehicles and the community
- Improved air quality and reduced emissions
- Increased productivity and efficiency
- Fewer vehicle journeys
- Better planning of construction logistics
- Reduced reputational risk

CLOCS began in the UK at the time of the 2000 London Olympics when in a short period of time 6 cyclists were killed by construction vehicles. This tragedy emphasised the need for the construction industry to be sensitive and aware of vulnerable road users: pedestrians, cyclists and motor cyclists moving around live construction sites.

Construction projects are complex. No two projects are the same, construction materials, handling methods and technologies are constantly evolving. For these reasons and many other unexpected events many construction projects run over time and over cost. CLOCS-A seeks to provide an overarching generic framework for potentially all types of construction projects with the objective of improving safety, sustainability, and construction engineering practice to bring projects in on time and budget to meet the project objectives safely.

Construction Logistics Plan (CLP)

Elements of the Standard's Management Plans

The construction logistics plan (CLP) provides the framework for planning and managing construction activity into and out of a proposed development site This activity is closely related to the design and construction project and the project work breakdown structure. A CLP is a strategic document that should integrated into the project management planning

process. The project management plan is the time-based detail of activities that will comprise the whole construction project.

Establishment of CLOCS-A in the lead company

The CLOCS-A standards should be implemented across multiple organisational levels for, a lead or principal contractoras well as its subcontractors performing a variety of tasks. Depending on the nature of the project the developer may also need to be cognscent of the CLOCS standards. At the beginning – ideally at project initiation, there needs to be a high-level of communication that may involve the main actors and include the different stakeholders, including community representatives, and others who will be impacted during construction operations.

Requirement: The first critical decision needs to be assigning the nominated parties, including the appointed delegate(s) who will be responsible for the CLOCS-A implementation, oversighting and updating. This must be documented.

Access approvals

A construction site generates multiple vehicle movements involving a range of vehicles from the cars and vans of workers to a variety of heavy construction vehicles of various configurations. The heavy construction vehicles may also be required to obtain permits for their use of the proposed arterial road network servicing the specific construction site. These permits may require vehicle information, proposed routes, and times of operation. Local Governments may also require permits for use of local roads for specific time of day periods, or to reserve roadside parking space which may require road lane closures. Cranes, low loaders, rigid and articulated tippers, and concrete agitators are some of the vehicles that may require special consideration for different access approvals to a construction sites. Minimizing trips and exposure to potentially hazardous entities such as schools, shopping centres, hospitals and other sensitive sites is an intrinsic theme in the route planning process.

Requirement: Document approvals by level of government and application dates and duration: Site Access for vehicle types • By route for each truck type • Over dimensional movements • Time of day movements approvals • Parking permission approvals (If applicable)

Route Planning

Route planning is a critical part of CLOCS-A because any moving vehicle has associated risks on infrastructure and vulnerable road users. Some routes may not be capable of carrying heavy configurations and will need alternative routes. This requires careful traffic engineering analysis that may use a variety of traffic management tools or the services of a consulting traffic engineer or traffic engineering company.

Requirement - The route planning process will:

- Document the procedure for route planning by vehicle configuration
- Document the route hazards by type (VRU hazards/other encountered/expected hazards)
- Document route instructions distributed to own and sub-contractor fleets
- Document method used for route planning
- Document the routes agreed for the specific vehicle types and their access approvals

Driver Hazard and VRU awareness and vigilance

Requirement - Ensure and document sub-contractor and own fleet drivers are provided with information, or are trained in:

- VRU vigilance recognition and response, as well as general
- Hazard vigilance recognition and response.

Efficiency and Productivity Initiatives

The CLP can embrace significant efficiency and productivity initiatives as new technology and delivery strategies emerge. A structured approach will include a review of alternative options available for transport, materials handling and the delivery of the different building componentry. A construction site may be able to use a waterway to transport heavy loads which may be prefabricated offsite. High productivity vehicles may be used to combine several truck loads thus reducing vehicle traffic. There may be two projects in an area, one of which generates spoil and another which requires that spoil for filling or site remediation. CLOCS-A ideally will review creative thinking to generate innovation, productivity and efficiencies.

Requirement: Describe and document.

When adopting new technology or planning tools enabling productivity and efficiencies:

Logistics Plan Statistical Reporting

Requirement: Report on a project timeframe by selected period: month/quarter/annual timeline

To/from site injuries

- Fatal accidents (vehicles/VRUs)
- serious injury, (vehicles/VRUs)
- truck crashes— Major, serious, moderate by own fleet and/or by contractor fleet. (vehicle/VRUs)
- truck type/configuration involved (vehicles/VRUs)
- planned trips by reporting period for specific load type (e.g., concrete, soil/rubble, heavy equipment, containers, steel, scaffolding, prefabricated items etc)
- actual trips by reporting period vs planned trips by reporting period
- total fuel used estimates by reporting period.

CLOCS-A Updates:

Requirement: Document and date:

- When was the last CLOCS-A update implemented? (Generally infrequently) Date:

CLOCS-A Logistics Audits:

Requirement: Document and date:

- When was the last audit undertaken?
- Were recommendations and findings implemented and when?

Tender clauses describing actions taken to minimise risk to VRU's, negative environmental and social impact.

CLOCS-A objectives are clear – zero accidents, reducing traffic congestion and the associated negative externalities of noise, GHGs and construction debris left on roads. A CLP needs to document how the project will meet these objectives. What planning, technologies and methods will be employed to ensure the objectives are realised. A CLP should include the appropriate procurement clauses in the tender and ensuing contracts that require contractors and subcontractors to bid accurately and realistically when they are required to incorporate and adopt the CLOCS-A standards.

Part B 1 Summary of Literature Review

A Literature Review of Construction Logistics Community Safety

Draft 1 for discussion

Executive Summary

Introduction

Construction Logistics and Community Safety (CLOCS) was initiated by Transport for London in 2013 (Delmonte and White, 2014). It began in response to 6 cyclist fatalities in London over a two-week period in 2013. Transport for London had for some time been aware of the growing incidence of cyclist accidents, in 2011 they reported that seven of nine Heavy Goods Vehicles (HGV) were involved in cycling fatalities. These HGVs were construction vehicles, concrete mixers and tip trucks. CLOCS was originally focused on cyclist safety (Construction Logistics Cycling Safety) however as it evolved in the UK its scope broadened to encompass broader issues relating to the impact of construction activities in urban areas.

In Australia road authorities and regulators adopted CLOCS and branded it as CLOCS A. VicRoads was a primary promotor of CLOCS. The launch of CLOCS A was initially attempted in 2018 under the guidance of VicRoads. This was a tumultuous period with changing government roles. The National Road Safety Partnership Program (NRSPP) transitioned from the Australian Road Research Board to its new host Monash University. The NRSPP (under Monash University) was the driver of CLOCS A when they recommenced the project in 2020.

The aim of this paper is to provide a literature review of Construction Logistics Community Safety in Australia (CLOCS A). The main themes from the literature are identified and discussed. The 11 TG3 work areas are associated with relevant references from the literature review. Gaps in the literature are identified which will require further library research. The need for a consolidated minimum standard for the construction industry was identified in Australia, with several organisations wanting to be involved and help drive CLOCS-A. The Chartered Institute of Logistics and Transport Australia (CILTA) was invited to participate in CLOCS-A. CILTA's parent group in the UK, CILT-UK, is heavily involved in the UK CLOCS.

Several factors have contributed to the development of CLOCS-A:

- The construction boom currently underway in Australia which includes major infrastructure projects in cities around Australia.
- Vulnerable road user (VRU) safety has received minimal attention in the heavy vehicle space despite the prevalence of serious and fatal injuries (refs? E.g. coroner report)
- the reputation of the construction industry as lagging behind other industries in terms of road safety (a 'good enough' mentality)
- the proven success of CLOCS in the UK

The literature review (which includes review of grey literature and web documents) aims to understand the current knowledge base (in Australia and internationally) around the issue of vulnerable road user (VRU) protection in the construction industry, with a focus on logistics solutions to protect this group of road users. The following questions guided the literature review:

1. Is it possible to understand the relative risk represented by construction vehicles to vulnerable road users, when compared with general haulage vehicles? If so, what is it? What are the limitations of the data available?
2. Are there specific risk factors which contribute to VRU-HV collisions, particularly in construction vehicles?
3. Have measures been identified that could be implemented to help reduce the number of such collisions? What role do logistics play in these solutions?

Table 1 maps the eleven key work areas for TG3 to the relevant literature with the reference numbers. The reference numbers are keyed to appendix 1.

Table 1 Key Work Areas for TG3 and relevant references.

Work Area	Description	References (see Table 4 for key)
1	Create a Construction Logistics Plan (CLP). This can embrace both a macro and several micro plans that span not only the logistics space but to a lesser extent the contract purchasing and the field operations, encompassing the protection of vulnerable area users is paramount.	1,11,13,14,29,32,34,38,39,40,42,43,44,48,52, 53, 57,60,61,62,70,122
2	Vehicle Movements and Traffic management planning for delivery into an off-site operation.	3,7,20,23,26,28,32,82,90,102,110,112,114
3	The need for specific Route Assessment Planning covering not only possible high-volume day-to day operations As such route assessment planning is essential to the project.	3,24,32,37,43,52,59,61,64,72,113,115,119
4	The larger and more diverse floats/flat tops that carry Over Dimensional, and Heavy Haulage loads, which may need alternative routing, in possibly different time windows is often done by specialist contractors. (Note: Route assessment for ODs is often handled by the specialist sub-contractor)	7,40, 79, 80,98
5	Where to place a range of construction activity sites, from assembly of major project components (perhaps from other assembly areas), storage and holding sheds and even truck parking and site inspection areas. There can be restrictions on many	10,18,20,23,24,43,69,78, 87,106,118

	urban construction sites due to size however, green field sites offer more site planning potential. It should be noted that smaller sites and smaller projects are far more compromised in space and flexibility and as many are urban they are also riskier.	
6	Outside the gate, the construction zone, the project interfaces with the community. As such minimizing freight exposure: noise, emissions and vehicle trips need planning attention as does the time windows allowed for construction.	2,3,4,6,11,13,22,34,39,46,47,67,68,95,99,97 ,100,109,111,114,115,123,124,125,126,127
7	Can other freight modes be used to assist or during the project's construction? This is often a neglected thought but there are examples where rail, barges have integrated with road transport to move specific project inputs. (Who knows what role larger drones may have in delivering vital spare parts to machine that has broken down.)	73, 75,76,81,83,84,117
8	Not all projects are major or mega projects. The elements of logistics planning also need to be scalable to suit medium and smaller projects that have shorter timeframes.	33,87,116
9	Across a major project's timeline elements may change and unplanned events can/will happen. These ad-hocs need to have a presence in the contract that allows the flexibility to overcome unexpected happenings. These could be partial route closures, unexpected changes to regulation or even network modifications impacting on the usual delivery of some materials.	88,
10	Are there multi-site/project economies of scale to be had with near vicinity projects? How could this work?	10,14,94,116
11	IT - Emerging Technologies and potential Integrations	7,12,31,37,41,42,43,52,54,57,68,76,77, 85,93,101,104,105,107,108,128
12	Causes and effects of construction site related accidents	74,86,96,97,103,123

13	Reverse logistics, deconstruction, salvage materials	89,91,92,
14	Contracts	120,121

Table 1 shows that some work areas have numerous supporting references whilst others Have fewer.

- Literature – 127 articles reviewed with summary of key words, themes, and findings.
- Interviews – 13 online interviews + 2 face to face interview.

Vulnerable Road Users and Vehicle Routing and Planning

There is a vast amount of literature on vehicle routing, scheduling, and related software. However, there is relatively little on routing regarding vulnerable road users. Bennett et. Al. (2018) provides a review of current route planning in Victoria and the development of a general planning tool: Human Impact Road Assessment (HIRA) to assess routes for various activities. Based on the 11 interviews for this TG3 study who was responsible for the selection of routes to a construction site varied depending on the organisational structure of the project. One rail project had the following organisational structure (Figure 1). The planner used a combination of Microsoft Project for short term planning and Primavera for corporate project management.

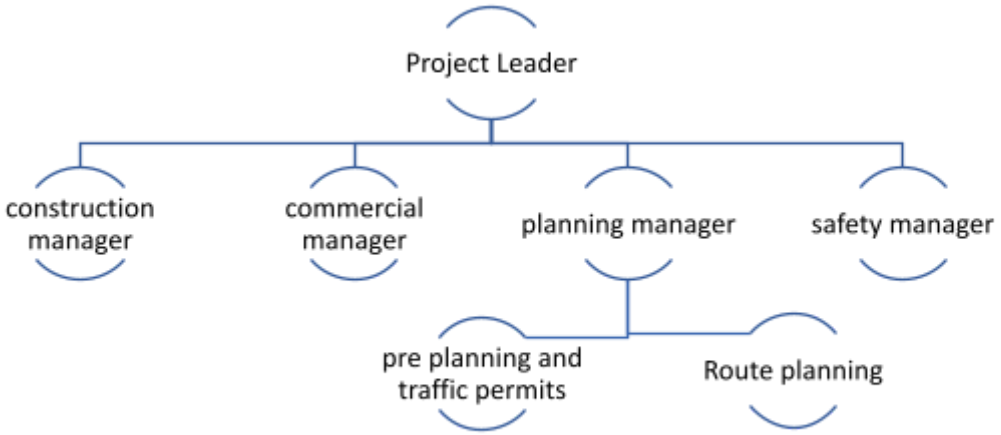

Figure 1 Rail project organisational structure

Detailed access and permits were managed by sub-contractors responsible for traffic management.

Traffic engineers in engineering firms work with governments both state and local to design and construct roads, intersections, and roundabouts. There is, like vehicle routing, a vast literature on road construction and traffic engineering management. There is less literature on considering vulnerable road users in traffic management. One document McElhanney (2018) did provide detailed engineering designs for roundabouts for vulnerable road users and heavy vehicles in a town in British Columbia, Canada. The consulting company provided detailed plans of a roundabout near a community with a high proportion of seniors. The company adopted a holistic design process considering social/cultural and environmental sustainability dimensions.

Q: What are the best Vulnerable Road User avoidance strategies discovered so far?

Observations: VRU avoidance strategies are being addressed in elements of the new Austroads driver training package

Construction Logistics Plans

The construction industry, currently, does not use the term construction logistics in Australia. The idea of a designated logistics manager in a construction company is not at all common. This is based on both the interviews for this study and asking managers in large and small construction companies about this term. Project managers fulfill the overall coordination role and vehicle traffic management to and from a construction site is handled by traffic management sub-contractors that work with a site manager or supervisor. A planning manager reporting to the senior project manager may be responsible for what would be termed “logistics”. In this study there was only one very large construction project that had a designated logistics manager.

However, a review of the construction literature did uncover many papers on construction and logistics. Two recent theses from Chalmers University in Sweden provide very relevant information on logistics processes. Andersson and Nilsson (2018 provide a case study of a large company managing several construction projects. The authors propose a detailed logistics planning system for a construction project. Janne (2020) has consolidated his research into a PhD which provides a rigorous background and framework for construction logistics setups. These two documents are valuable resources for the development of a construction logistics plan.

Q:What countries and companies came to light with Construction Logistics Plans?

Q:What differentiated the good ones?

Route Assessment Planning

A review of the literature found 8 relevant articles. Bennett (2018) reviews the interaction of HGV’s and VRU’s in Victoria with a discussion on CLOCS, the safety taskforce forum and HIRA. Choudari et.al. (2017) discusses route optimisation for highway construction and notes substantial savings in logistics costs with material planning. Fraiser et.al. (2017) describe the London Cross Rail Project which used a vehicle management planning system. This is an important paper which provides insight into the UK Freight Operator Recognition Scheme. The literature points to the value of a detailed planning process for a construction project.

Similarly

Q: What techniques went into Route Planning ? Pencil & Paper, Software ? Best Practices?

Interfaces with the Community

Large construction projects in cities have a major impact on the functioning of a city during their construction. Decision makers at all levels of government are aware of the social licence granted to them and they are sensitive to negative externalities such as noise, congestion, dust and disruption of daily patterns of living. The literature review identified 11 papers that are useful in developing a community communication strategy to manage the negative externalities. Brusselaers et. al. (2021) use a Multi Actor Multi Criteria Analysis (MAMCA) methodology applied to a case study in Brussells. They note that different processes and site, actor, and end condition specific which means there is a need for flexibility, replicability and scalability.

Access

Q: How did companies go about getting access approval? Other Countries and Australia (from interviews)

Emerging Technologies

Emerging technologies are being employed by construction companies to minimise onsite accidents with machinery. Construction sites are well known to be dangerous and construction companies are keenly aware of their occupational health and safety responsibilities. There is also an increasing awareness and sensitivity to work related road accidents. There were 11 relevant papers on emerging technologies that can prevent HGV accidents. Chang (2016) provides a comprehensive report on current technologies used in the USA. Holmes (2019) has an important review of road safety related to construction projects based on his Churchill Fellowship. Sochon et.al. (2013) in an article in the Australasian College of Road Safety recommends creating a national work-related risk management framework for Australia to reduce road trauma related to work.

Q: Was there a best or a good technology to assist avoiding VRUs?

Comments and Observations

Clocs began in the UK because of the alarming incidence of cyclists being killed by construction vehicles associated with the London 2000 Olympics. Its focus was on cyclists and vulnerable road users. Over time it broadened to include community safety. Generally, construction projects consider safety as a concern only within the construction site. They do not see movements to and from the construction site as part of their remit. Large construction projects that involve governments tend to require construction companies to minimise their impact on the surrounding community. However, construction companies do this because they are compelled either by road rules or as part of contractual requirements.

There are however critical commercial issues why construction companies should adopt Clocs. It is well known in the construction industry that large projects without exception run over time and over budget (Flyvbjerg 2014). This happens because large projects are complex, unique and dynamic. They are wicked problems that need to be well managed and despite the best efforts lose large amounts of money.

Clocs via Construction Logistics Planning is one process that if applied to a construction project could improve site productivity, reduce costs, and improve environmental sustainability. Logistics managers are an important part of the management team in the manufacturing and retail industries. Clocs A could play a role in encouraging the construction industry to use logistics managers and logistics processes not just for community safety but for commercial productivity and gain. It is a win win.

References:

Andersson O, Nilsson A (2018) Planning for Construction Logistics: An evaluation and development of a construction logistics plan at Serneke, Master's Thesis in the Master's programme Design and

Construction Project Management, Department of Architecture and Civil Engineering, Division of Construction Management, Chalmers University of Technology, Gothenburg, Sweden.

Bennett M., Colussi L., Thompson J. (2018) Human Impact Route Assessment – Identifying Risks to Vulnerable Road Users along Construction Vehicle Truck Routes. AITPM Conference paper, available on VicRoads website (2022): Construction Trucks and Community Safety-Route selection.

Brusselaers N., Mommens K., Macharis C (2021). Building Bridges: A participatory stakeholder framework for Sustainable Urban Construction Logistics. Sustainability; 13, 2678.

Chang, J. (2016, July). Summary of NHTSA heavy-vehicle vehicle-to-vehicle safety communications research. (Report No. DOT HS 812 300). Washington, DC: National Highway Traffic Safety Administration.

Choudhari S, Tindwani A. (2017) Logistics optimisation in road construction project, Construction Innovation Vol 17,2 pp 158-179.

Flyvbjerg B (2014) What You Should Know About Megaprojects and Why: An Overview. Project Management Journal, Vol 45, No.2, pp6-19.

Fraser D., Haig J., Heduan M., Limna G. (2017) Crossrail project: logistics management strategy for the Elizabeth line, London. Proceedings of the Institution of Civil Engineers, Civil Engineering, Vol 170, Issue CE5.

Holmes M. (2019) Investigating Best Practice To Improve Heavy Vehicle Safety in Urban Environments. The NRMA -ACT Road Safety Trust Churchill Fellowship

Janne M. (2020) Construction Logistics in a City Development Setting, Linkoping Studies in Science and Technology. PhD Dissertation N0. 2091

McElhanney (2018). Improved roundabout safety for heavy vehicles and vulnerable users, Sicamous, BC. TAC Road Safety Awards.

Sochon P., Stuckey R., Murray W., Kwok A. (2013) Corporate Road Safety: an opportunity to reduce the road toll through integrated Government policy. Journal of the Australasian College of Road Safety – Vol24 No.3: p56-60.

Based on the literature review to date the following key themes can be discerned:

A comprehensive review of the literature shows that there are fourteen main themes related to heavy construction vehicles and vulnerable road users (VRUs). These are:

1. CLOCS Construction Logistics and Community Safety
2. Studies focusing on improving the construction logistics supply chain in terms of efficiency and effectiveness
3. Cyclists and pedestrians and their interaction with Heavy Goods vehicles/ trucks
4. Stakeholder engagement
5. Route planning and traffic management
6. Policies and methodologies to improve construction site management and reduce negative environmental impacts
7. Standards for improving vehicle and driver safety and work-related road risk.
8. Safer trucks, safety technology, digital technologies
9. Urban/ city logistics
10. Construction consolidation centres

11. Education of community, construction workers and contractors
12. 12. Causes and effects of accidents
13. Reverse logistics
14. Contracts

Methodology

The initial literature review was commenced/ conducted by Olivia Dobson and Astrid Kauffmann. The research team from Master Research Australasia has subsequently built on this.

This search (initial literature review) resulted in >4,000 results in Google Scholar and >9,000 results in TRID, the majority of which were not relevant. Abstracts and titles were visually scanned for relevance. TRID is an integrated database that combines the records from TRB's Transportation Research Information Services (TRIS) Database and the OECD's Joint Transport Research Centre's International Transport Research Documentation (ITRD) Database. TRID provides access to more than 1.3 million records of transportation research worldwide.

The exact search string was:

("construction logistics" OR "logistics planning" OR "route assessment" OR "construction vehicle" OR "logistics hub" OR "urban freight transport" OR "logistics park") AND ("vulnerable road user" OR "road safety" OR cyclist OR motorcyclist OR pedestrian)

The initial search resulted in 631 papers which were scanned for relevance to the key work areas of TG3.

The Web of Science data base was scanned using the key words: construction logistics and construction logistics plan. Nearly 2,000 articles were identified but many of these were not related to CLOCS.

Grey literature was also scanned.

Key Websites Related to CLOCS – CLOCS A

Some key websites were identified that are relevant to CLOCS and CLOCS-A. These are identified in Table 3.

Table 3. Key websites and summary of their activities

Key websites	Website	Summary
Considerate Constructors Scheme (CCS)	https://www.ccscheme.org.uk/ccs-ltd/what-is-the-ccs2/	UK organisation. Founded to raise standards in the construction industry. Organisations registered with CCS make a commitment to conform to Code of Considerate Practice: respect the community, care for the environment and value their workforce. A formal CLOCS monitoring approach has been developed by the CCS, part of the CLOCS secretariat and administration group. This allows contractors to stablish how they are performing on a site by site basis.

Key websites	Website	Summary
Tideway London	https://www.tideway.london/	Tideway is the company delivering the Thames Tideway Tunnel. They are Champions of the Fleet Operator Recognition Scheme (FORS)-all transport providers must be Bronze members at least before starting work on the project and attain Silver std as a minimum after 6 months of their first project site visit. They are also Champions of CLOCS and their community safety initiative. Vehicle and driver standards meet and exceed the minimum terms of compliance with CLOCS.
HS2	https://www.hs2.org.uk/	HS2 is Britain's new high speed rail line being built from London to the North-West, with HS2 trains linking the biggest cities in Scotland with Manchester, Birmingham and London. It is the largest infrastructure project in Europe and the most important economic and social regeneration project in decades. The project prioritises minimising emissions considering air quality, creating as little ground settlement/ movement as possible, minimise construction noise and vibration, Manage operational noise and vibration and traffic management. Traffic management includes avoiding local roads, improving local roads, working with local authorities, planning effectively. HS2 has a Code of Construction Practice: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/593592/Code_of_Construction_Practice.pdf. HS2 has prepared a High Speed 2 Phase one and 2a Route Wide Traffic Management Plan: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1023529/HS2_Phase_One_and_2a_RTMP__updated_July_2021.pdf
CLOCS Construction Logistics and Community Safety	https://www.clocs.org.uk/resources.php	This website contains the CLOCS Documents and Policies, and Guides and Resources related to CLOCS.
CLOCS Works	https://www.clocs.org.uk/page/CLOCSworks	CLOCS Works is a campaign launched 8th Sep 2020 to urge UK local authorities and metro city mayors to sign up to and adopt and implement CLOCS. This is to address 28+K lives killed or injured in the last 5 years by construction vehicles in the UK.
CLOCS A	https://clocs-a.org.au/	Construction Logistics and Community Safety – Australia (CLOCS-A) is a national good practice approach for managing the risks and impacts associated with a construction project's on-road transport and logistics activities to community road safety. Key website explaining current status and plans for CLOCS A
Human Impact Route Assessment (HIRA)	https://www.vicroads.vic.gov.au/safety-and-road-rules/road-safety-programs/con	HIRA is a tool that has been designed to support better choice of heavy vehicle traffic routes that prioritises vulnerable road user safety and minimises the impact on daily lives of communities during periods of disruption related to construction (Bennett 2018; Thompson et al, 2018).

Key websites	Website	Summary
	struction-trucks-and-community-safety	Thompson, J, Colussi, L., Bennett, M., Trumper, V., Mikovic, D., McLeish, S. (2018) The Human Impact Route Assessment (HIRA) tool. Conference, ARSC (Australian College of Road Safety). Bennett M., Colussi L., Thompson J., Ross J. (2018) The Human Impact Route Assessment Tool, a Decision Support Tool for Major Construction Project Traffic Planning. Poster, VicRoads.
Fleet Operator Recognition Scheme FORS	FORS (2022) Home. https://www.fors-online.org.uk/cms/	FORS is a voluntary accreditation scheme for fleet operators. It aims to "raise levels of quality within fleet operations and to show which operators are achieving exemplary levels of best practice in safety, efficiency, and environmental protection." The FORS Standard defines the requirements that operators need to meet to attain and maintain FORS accreditation. They can become FORS Bronze, Silver or Gold accredited. Accreditation is voluntary. Scope of the FORS standard relates to the "management of the fleet operation and its vehicles and drivers".

Figure 1 uses the Construction Logistics framework suggested by Janne in his PhD thesis. There would be other frameworks that could be designed but Janne has based his work on case studies of Swedish construction companies.

Construction Logistics Planning System (after Janne)			
1. Initiating	Preparation of logistic guidelines for site	4. Execution	Work progress monitoring
	Strategic planning for project management		Schedule and plan updating
2. Design	Preparation of logistic guidelines for the design		Adjusting orders to current demand for resources, workforce, materials, subcontractors
	Preparation of requirements for specifications		Planning and coordinating deliveries, loading, un-loading & warehouse, distributing
	Logistic guidelines for tender preparation		Implement logistics quality standards
	Quality system of logistic service		Managing waste
3. Planning	Preparation of schedules &charts of labour & equipment utilisation of sub-contractors work & material consumption	5. Commissioning	Dismantling of site installation
	Preparation of a logistic concept of the construction site		Managing information flows and documentation
	Design of installations on site and disassembly		
	Preparation of guidelines for lease/purchase of machines		
	Preparation of selection of suppliers		
	Assessment of logistic service efficiency & environmental impact		
	Preparation of planning & placing orders, scheduling of deliveries		
	Waste management planning		

Figure 1 Elements of the CLP

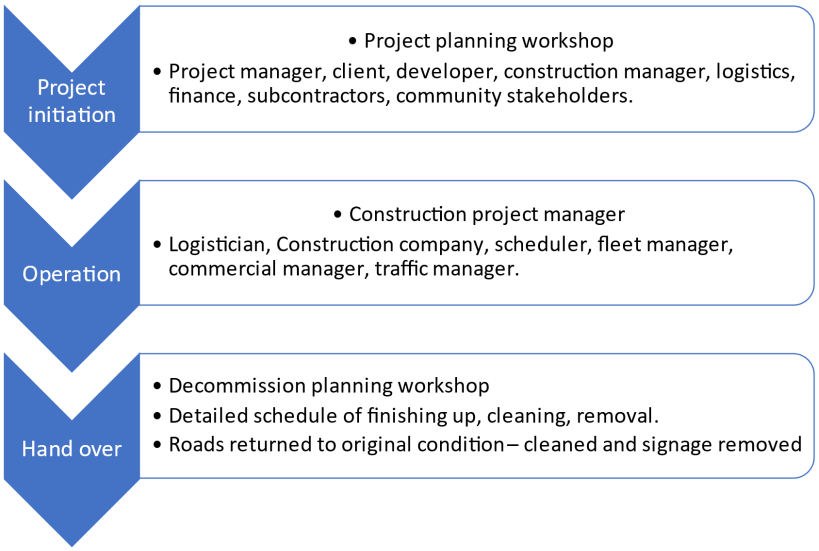

Figure 2 Project Planning Process

New ref#	References	Key Words	Themes	Findings
1	Andersson O, Nilsson A (2018) Planning for Construction Logistics: An evaluation and development of a construction logistics plan at Serneke, Master's Thesis in the Master's programme Design and Construction Project Management, Department of Architecture and Civil Engineering, Division of Construction Management, Chalmers University of Technology, Gothenburg, Sweden.	construction logistics, consolidation centre, dense cities, construction delivery systems, Just in Time, material handling, logistics planning	Construction company case study, site observation, interviews, need for construction logistics plan. An abductive research case study on a Swedish Construction Company's 3 large projects – observing their planning processes and the tools they used	Processes differ between sites. Projects have implemented dedicated logistical solutions to varying extent. Lack of standardized processes for construction logistics-responsibility seldom connected to one person at site. A construction logistics plan is a solution to ensure an efficient logistics process: coordinates logistics to overcome congestion on construction sites. Standardising planning and execution process simplifies transition between projects and the processes it entails. A contractor has the responsibility of coordinating the activities throughout the construction process. A construction logistics plan is developed and proposed as a tool for coordinating logistics to overcome the obstacles of congestion on construction sites. The thesis concludes by recommending investigating key ratios regarding logistics and what logistics tools could generate them.
2	Australian Road Research Board (2020) construction Logistics and Community Safety – Australia (CLOCS A) – A practical guide. Draft guidance document.	Safe systems approach, risk management, stakeholder involvement	Safety leadership, planning, guidelines, planning.	The objectives of the guide are to: eliminate collisions between heavy vehicles and the community; improve efficiencies through fewer vehicle journeys; establish a single national

New ref#	References	Key Words	Themes	Findings
				standard for industry to meet; and reduce reputational risk.
3	Bennett M. (2018) Vulnerable Road User Inclusion in Spoil Removal Route Planning, School of Engineering, RMIT University, Melbourne, Victoria, Australia	Route selection, vulnerable road users, tunnelling, route planning	Current codes and standards focus on the immediate vicinity of, and on the work site, not the entire haulage route. Truck and VRU interactions, current route selection, gaps in methodology, CLOCS, VRU safety taskforce, HIRA (Human Impact Route Assessment), in the decision-making process and pilot study, study	Safety risk to VRUs often overlooked in route selection process for truck removing spoil from tunnelling sites. Paper mentions Heavy Vehicle Network maps and Smart Roads Framework in Victoria. These do not necessarily reflect suitability of roads wrt VRU safety. CLOCS is discussed. VRU safety taskforce created after a forum with Melb Metro Rail Authority and stakeholders. HIRA was created as a decision support tool providing a structured risk assessment to support route selection. It also considers interactions further than the project site.
4	Brusselaers N., Mommens K., Macharis C (2021). Building Bridges: A participatory stakeholder framework for Sustainable Urban Construction Logistics. Sustainability; 13, 2678.	Construction logistics; stakeholder involvement; Multi-Actor Multi-Criteria Analysis	Empirical Analysis, Logistics scenarios, case study, stakeholder analysis. Construction logistics scenarios.	Participatory decision-making framework (MAMCA) case study of Brussels. Different processes are site, actor and end condition specific. There is a need for flexibility, replicability and scalability.

New ref#	References	Key Words	Themes	Findings
5	Carrese S., Mantovani S., Nigro M. (2014) A security plan procedure for Heavy Goods Vehicles parking areas: An application to the Lazio Region (Italy). Transportation Research Part E. 65 pp35-49.	HGV parking areas, Safety and security, freight transport, stated preference survey of truck drivers in Italy.	Security of HGV parking areas.	Surveys, proposed methodology, regional study, economic analysis. Design, construction, and operation of HGV parking areas not well defined and varies from country to country in Europe. Truck drivers will pay 4 to 6 euros for parking. High security standards could persuade drivers to choose one area over another.
6	Celik T, Budayan C. (2016) How the Residents are affected from Construction Operations Conducted in Residential Areas. Procedia Engineering 161:394-398.	Adverse Impacts, Stakeholder Management, Criticality Index	Questionnaire survey analysis based on 18 factors, culture and region factors.	Based on a survey of residents (conducted in 3 cities of North Cyprus), pollution-loss of peace and quietude of the neighborhood, cleanliness of the house, and degradation of ambient conditions were identified as the most disturbing nuisances. Country conditions and regional culture are considered to play an important role in the intensity of adverse impacts.
7	Chang, J. (2016, July). Summary of NHTSA heavy-vehicle vehicle-to-vehicle safety communications research. (Report No. DOT HS 812 300). Washington, DC: National Highway Traffic Safety Administration.	vehicle-to-vehicle communications, crash avoidance, connected vehicle, dedicated short range communications (DSRC), safety applications, safety pilot model deployment, heavy vehicle,	Vehicle safety systems, blind spots, collision warning, effectiveness, and benefits of V2V technology	Report summarises NHTSA's V2V research on heavy vehicles. Info on light V2V (LV) research from last decade is applicable to HV, including dedicated Short Range Communications and the supporting credential management system that enables trust for V2V basic safety messages. Aspects that differ in HV fleet is widespread use of combination vehicles (tractor pulling a semitrailer) which articulate when turning. Intersection Movement Assist

New ref#	References	Key Words	Themes	Findings
		commercial vehicle, retrofit safety device, integrated truck, transit retrofit package, V2V, V2I, safety benefits		and Lane Change Warning has been developed based on LV application prototypes. Research continues into BSM representation for articulated vehicles, message set adjustments have been developed. Results are promising. In 2013 3964 people were killed and 95000injured in crashes (in US) involving at least one truck-it is estimated 70% scenarios could be potentially addressed by V2V systems
8	Coroners Report Victoria (2021) Finding Into Death With Inquest, Court Reference (COR 2017 1148)	Bicycles, heavy vehicle, collision recommendations, blind spot detection technology, under-run protection, visibility, safety	Coroners report, construction vehicle, cyclist.	HV driver failing to see cyclist can be due to vehicle design, road/ intersection design, driver inattention, visibility of cyclist. Transport infrastructure council found pedestrians, cyclists and motorcyclists are particularly vulnerable at intersections and make up over half of fatalities.

New ref#	References	Key Words	Themes	Findings
9	Delmonte E., White H. (2014) Construction Logistics and Cyclist Safety (CLOCS): From Research to Practice, 2014 European Transport Conference, Association for European Transport. IMPORTANT PAPER	Fleet Operator Recognition Scheme (FORS), Construction Logistics Plans (CLPs), work-related road safety, vehicle safety, best practice, CLOCS, road risk, collisions, construction traffic, awareness, vehicle and mirror design	Multiple research methods, collision data, literature review, construction logistics plans.	Paper updates the CLOCS program and the 2012 report by Delmonte et al. Describes the transition from research to practice – 3 works streams – improving vehicle safety, address safety imbalance on work related road safety and encourage adoption of best practice. Notes that CLOCS is a structured targeted program of improvements that is now led by the construction industry – transport operators, property developers, construction clients, major construction projects, primary contractors, regulators and associations. Summarizes of 2012 report and gives a table of CLOCS recommendations. Recommendations are linked to the findings.
10	Dubois A, Hulthen K, Sundquist V. (2019) Organizing logistics and transport activities in construction, The International Journal of Logistics Management, Vol 30, No. 2, pp 620 – 640.	Europe, Supply chain integration, Buyer–supplier relationships, Logistics cost, sourcing and supply chain processes, qualitative interviews, outsourcing insourcing	Swedish study, analyses 3 configurations from case studies, construction site, the supply chain and across both. Decentralisation v coordination and more generic coordination across sties. 56 interviews.	The three transport logistics configurations (1. Decentralised coordinated, 2. on site coordinated, 3. supply network coordinated) can all improve efficiency of coordination beyond the construction site. Standardization of solutions by logistics specialists can provide wider benefits.

New ref#	References	Key Words	Themes	Findings
11	Fredriksson A., Janne M., Nolz P., de Chenneviere P. R., van Lier T., Macharis C. (2021) Creating Stakeholder awareness in construction logistics by means of the MAMCA. City and Environment Interactions, Vol 11, 100067.	Multi-Criteria Decision Analysis, Decision support, Construction logistics setups, Urban construction, Action research	Multi actor multi criteria analysis (MAMCA) – customised methodology for construction stakeholders. Cases Brussels, Vienna, Gothenburg, Stockholm. Workshop descriptions of action research. Smart Governance process.	The paper developed a MAMCA method for construction logistics by applying action research approach. It (the methodology) identified relevant stakeholders, enabled different stakeholder preferences of CLSs (construction logistic setups) to be identified and understood, the need for one stakeholder to take responsibility for initiating a CLS. MAMCA must be adapted to fit the construction context. Main differences are-predefined construction logistics alternatives; predefined actors and criteria groups; the possibility of using the method in role play to create awareness of stakeholder views in homogenous groups.

New ref#	References	Key Words	Themes	Findings
12	Holmes M. (2019) Investigating Best Practice To Improve Heavy Vehicle Safety in Urban Environments. The NRMA -ACT Road Safety Trust Churchill Fellowship.	Vehicle, heavy, driver, standards, transport, safety, road, urban, requirements, logistics, operators, construction, systems, technology, regulation, FORS, CLOCKS, crash, trucks, training, accreditation.	Summary of practices identified to investigate best practices to improve heavy vehicle safety. Findings from UK, Sweden, Belgium, Luxembourg and Baston and New York. Recommendations for accreditation schemes, local access regulation, fatigue, AEB, radar technology, training and competency framework.	HV safety is a serious issue in Australia. Effective HV safety accreditation schemes exist within the UK based on safe systems approach to road safety with a regulatory framework requiring minimum standards for road transport operators. HV in Northern Europe are younger and required to comply with a broader range of mandatory passive and active vehicle safety standards and technologies. London and NY have introduced local regulations to improve safety of HVs: require improved driver field of view and underrun protection. Emissions schemes further support improvements to road safety outcomes. Professional driver training and competency standards in European Union equip drivers with safety critical knowledge and skills to support technical driving skills. Sustainable methods of urban logistics optimize deliveries through reducing, retiming or rerouting heavy vehicle movements in urban environments. Improvements to HV safety require leadership, collective commitment from government agencies, regulatory authorities and industry champions to influence change.

New ref#	References	Key Words	Themes	Findings
13	Holmes M., Ross J., Porter A., Jones S. (2018) Managing Vulnerable Road User Safety in Urban Environments during Construction of Major Transport Infrastructure Projects. Proceedings of the 2018 Australasian Road Safety Conference, 3-5 October Sydney, Australia	Safe Systems approach, heavy vehicle safety, standards, technology, training, construction traffic, logistics plans, risk	Extended abstract, Overview of the safe system approach to manage road safety during construction, Heavy vehicle safety standards, risk informed construction traffic and logistics plans, spoil removal methods, public awareness, driver training and competence.	Contextualizes CLOCS and FORS for Australia. Holistic management framework by applying safe systems. Embed a safe system approach to road safety into construction delivery. Draws on examples from major transport projects in Sydney and Melbourne.
14	Janne M., Fredriksson A., Berden M., van Amstel W. P. (2018) Smart Construction Logistics, Research Gate	Construction logistics governance, smart governance, stakeholders, sustainable construction, public authorities	Handbook, Smart Governance Concept, Methodology	Authors note that improved construction logistics can improve the productivity of a construction project by 30%.
15	Maali O., Kepple N., Lines B. (2022) Strategies to Achieve High Adoption of Organisational Change Initiatives with the AEC Industry. Journal of Management Engineering, Vol 38, no. 4, p10.	Architecture Engineering Construction Organisational Change Strategies	Interdisciplinary literature review, survey, data analysis	An extensive literature review identified 6 variables contributing to successful organizational change: Senior leadership commitment, training resources, communicated benefits, realistic time frame, measured benchmarks, change agent effectiveness and a change adoption construct. Training resources was not statistically significant. Change

New ref#	References	Key Words	Themes	Findings
				agent effectiveness had a significant impact. Results based on 633 AEC organization responses in USA and Canada.
16	Pokorny P., Pitera K. (2019). Truck-bicycle safety: an overview of methods of study, risk factors and research needs. European Transport Research Review 11:29	Trucks, Bicycles, Safety, Risk factors, Safety measures	Scoping review of literature related to bicycling safety – 43 documents analysed in detail. TRID database.	Important study on truck cyclist safety. Knowledge of risk factors contributes to implementing efficient safety measures. Useful for evaluating value of efforts to reduce risk and improve safety associated with truck bicycle interactions. Consider system level measures related to policy, planning, design and operations.
17	Road Safety Victoria (2020) Truck and Pedestrian Crash Data Analysis Victoria Jan 2014-Jun 2019. Department of Transport, Victorian State Government.	Metro, regional, location, truck body type, age	Truck and Pedestrian crash data, statistical analysis	Statistics on truck and pedestrian crashes between January 2014 and June 2019. There were 95 crashes reported: 71% involved a heavy rigid truck body type, 6% a prime mover B-double, 20% a prime mover-single trailer and 3% a prime mover only; Most crashes were in the metro area- 22% resulted in a fatality and 54% serious injury. In the regional area, 9% resulted in fatality and 15% in serious injury.

New ref#	References	Key Words	Themes	Findings
18	Sundquist V., Gadde L-E, Hulthen K (2018) Reorganizing construction logistics for improved performance. Construction Management and Economics, Vol 36. No. 1 pp49-65.	Logistics; site operations; off-site; performance, improvements; network analysis	Logistics reorganization can improve construction industry performance. Theoretical framework proposed	This study explored strategic actions to reorganise construction logistics by improving connections between on-site and off-site logistics; develop a theoretical framework for analysis of potential options for reorganising. 28 interviews with representatives of 13 organisations-provides a theoretical framework to improve logistics performance; empirical study shows that a logistics specialist can improve on-site logistics substantially. Requires joint planning and exchange of information. Data analysis.
19	Davies G., White H. (2015) Reducing accidents between construction vehicles and cyclists. Proceedings of the Institution of Civil Engineers, Civil Engineering; Vol 168 Issue CE3:131-137.	TfL, cycling fatalities, Heavy good vehicles, Vulnerable Road Users, Construction logistics.	CLOCS, cyclist fatalities, cyclist safety, action plans	See ref 9 - Paper updates the CLOCS program and the 2012 report by Delmonte et al. Describes the transition from research to practice – 3 works streams – improving vehicle safety, address safety imbalance on work related road safety and encourage adoption of best practice. Notes that CLOCS is a structured targeted program of improvements that is now led by the construction industry – transport operators, property developers, construction clients, major construction projects, primary contractors, regulators and associations. Summarizes of 2012 report and gives a table of CLOCS

New ref#	References	Key Words	Themes	Findings
				recommendations. Recommendations are linked to the findings.
20	AECOM (2017). Investigating the Impacts Caused by Construction Delivery Inefficiencies. Transport for London	Construction Delivery Inefficiency, Data Management Systems, Vehicle Holding Areas.	Methodology, Data, Benchmarking, KPIs, Best Practice	Site management -variance between scheduled vehicle arrival-DMS (delivery management system) time and actual -fluid and dynamic. Significant variation between DMS, their capabilities and stakeholders-ranging from basic to highly enforced. Different vehicle holding areas VHAs were identified: within construction site; adjacent or nearby-on and off street; remote from construction site; consolidation centres. These were considered important for managing vehicles at site-help mitigate against negative impacts e.g. traffic congestion, onsite incidents. Collision, weather and driver illness. Operator engagement-there are peaks in deliveries during the day. Varying awareness amongst local planning authorities, developers, planning specialists, contractors and logistics operators regarding booking deliveries and compliance. Stakeholders were using DMS but not monitoring, KPIs, reporting. Analysis and impact modelling: need for more training and planning by using CLPs; delivery inefficiencies impact on environment; safety impact-DfT have calculator for costs of accidents per mile; infrastructural impact-extra road wear; each site is unique so Cost with/out VHA or with/out DMS varies.

New ref#	References	Key Words	Themes	Findings
21	Australian Government, Department of Infrastructure, Transport, Regional Development and Local Government. (2010) Australasian Road Safety Research, Policing and Education Conference, National Convention Centre, Canberra, 31 August – 3 September 2010, Special Issue, Bicycling Safety, Journal of the Australasian College of Road Safety, August 2010, Vol 21 No. 3. pp76.	Cycling safety, advocacy, crash prediction, injuries, cyclist visibility	Proceedings of a conference on bicycling safety, cycling infrastructure	Analysis of 37 fatal cycling accidents in Adelaide between 1994 and 2006. Trucks were involved in some of these accidents. State governments are encouraging cycling and developing safer cycling, on road bicycle lanes, cycle networks. Drivers lack awareness of cyclists. Development of crash models with road factors. There are reductions in accidents when flows reach 100 cyclists per day at traffic signals. Cyclist fatalities have remained steady over time. Cyclists overrepresented in fatalities and serious injuries and underrepresented in interventions to reduce fatalities and injuries.

New ref#	References	Key Words	Themes	Findings
22	Brusselaers N., Mommens K., Janne M., Fredriksson A., Venas C., Flyen C., Fufa S.M., and Macharis C. (2020) Economic, social and environmental impact assessment for off-site construction logistics: the data availability issue. IOP Conf. Series: Earth and Environmental Science 588 032030	Construction logistics, data availability, impact assessment framework, harmonization	Literature review; estimates of freight traffic related to construction projects: Netherlands (30-40% in Amsterdam, in 2017-80% of traffic accidents were related to construction traffic); Sweden construction traffic represent 20% in total freight traffic; London: construction industry represents 35% of daytime HGV traffic and 38% of am peak traffic; Brussels Capital region: in 2016 construction transport represented 20% of total traffic. Empiric research	Construction strongly relies on logistics activities, which in turn are the source of environmental nuisances-external costs when not borne by the polluter themselves e.g., GHG emission, air pollution, congestion etc. Logistics flows data are typically scattered amongst different actors and various in format. There are large gaps in available data on urban construction logistics flows. The paper presents what is possible to calculate using available data in 4 pilot cases-Belgium, Sweden, Norway and Austria (MIMIC project). Harmonizing different data categories and sources to feed the framework with relevant logistics variables. The various data sources highlight the complexity to develop a framework flexible enough to cope with specific local constraints, whilst generic enough to allow comparability across the European cases and across construction logistics globally. There is a need to shirt toward other data collection methods e.g., GPS, digital waybills etc.

New ref#	References	Key Words	Themes	Findings
23	Carrese S., Mantovani S., Nigro M. (2014) A security plan procedure for Heavy Goods Vehicles parking areas: An application to the Lazio Region (Italy). Transportation Research Part E 65: 35-49.	HGVs parking areas; safety and security; freight transport	Survey of public and private administrations, Italian haulage companies and truck drivers. Phone surveys and on-site surveys. In Europe approx. 72% of total land-based freight transport is made by road (2009) and expected to increase by 50% 2005-2035. Security for drivers and goods.	Truck drivers in Italy are not significantly influenced by what they are carrying but primarily by the type of services provided inside parking areas. High security standards can persuade drivers to choose one parking area over another and to pay for long term parking. The fee truck drivers are prepared to pay is relatively low 4 to 6 euros.
24	Choudhari S, Tindwani A. (2017) Logistics optimisation in road construction project, Construction Innovation Vol 17,2 pp 158-179.	Procurement, Optimization, Supply chain management, Logistics, Construction material, Cost modelling	Materials movement in road construction, route optimisation, material delivery, highway construction, road construction project	Planning material logistics of an entire road project using optimization provides substantial saving in logistics costs

New ref#	References	Key Words	Themes	Findings
25	Cicchino J.B., McCarthy M.L., Newgard C.D., Wall S.P., DiMaggio C.J., Kulie P.E., Arnold B.N., Zuby D.S. (2020) Not all protected bike lanes are the same: Infrastructure and risk of cyclist collisions and falls leading to emergency department visits in three U.S. cities. Accident Analysis and Prevention 141: 105490	Bicycle; Separated bike lane; cycle track; bike path; streetcar tracks; bicycle facilities; injury	Interviews with ED patients. Heavier separation, less frequent intersections with roads and driveways, less complexity appear to contribute to reduced risk in protected bike lanes. Minimise conflict points, increase visibility where unavoidable. Risk increased when construction or parked cars blocked the cyclists path.	Certain bike facilities (bike lanes) are safer for cyclists than riding on major roads. Protected bike lanes vary in how well they shield riders from crashes and falls. Some designs may introduce new hazards. Heavier separation, less frequent intersections with roads and driveways, and less complexity appear to contribute to reduced risk in protected bike lanes. Minimise conflict points when choosing where to place bike lanes, implement countermeasures to increase visibility at these locations when they are unavoidable.
26	Delmonte, E., Manning, J., Helman, S., Basacik, D. Scoons, J., Chappell, J., Stannard, J., Jones, M. & Knight, I. (2012) *Construction Logistics and Cyclist Safety: Technical Report* - Project Report PPR639. Crowthorne: TRL Limited	Construction vehicles, bicycle safety, collisions, fatalities, vehicle design, heavy goods vehicle, risk, vehicle routing, construction logistics plans (CLPs), interviews, road risk, awareness, FORS, visibility, driver error, workload, vehicle and mirror design, delivery time slots	The key report justifying CLOCS. Analysis of collision data, risk analysis, literature review, introduces construction logistics plans. Driver behaviour. Recommendations. Construction site interviews.	1. Raise profile of work-related road safety, 2. Develop nationally recognized standard, 3. Improve work related road safety management in construction industry, 4. Use exiting channels to raise awareness (FORS), 5. Make construction vehicles and journeys safer, 6. Principal contractors and clients use realistic delivery time slots, 7. Research into pay per load contracts, 8. Improve data, 9. Ownership of recommendations. Interview questions for construction industry.

New ref#	References	Key Words	Themes	Findings
27	Demographic influences, Safety consciousness, Safety citizenship behavior of construction workers, Safety Science 129.	Questionnaire survey, construction workers	Safety leadership, safety consciousness, safety citizenship behavior, questionnaire of 550 Chinese construction workers – one construction company and one real estate company, statistical analysis	Construction workers safety consciousness and safety citizenship behaviour have potential to improve personnel safety of construction workers. Differences were found based on gender, education level and lengths of service. Construction organisations need to pay attention to vulnerable workers and provide strategies to enhance occupational safety of construction workers
28	Department of Transport. Safety Essentials: Accommodating Pedestrians and Bicycle Riders at Temporary Road Works. Best Practice Guidance, June 2020. Department of Transport Victorian State Government	Traffic management, best practice, safe environments for pedestrians and cyclists, construction sites, major project work	Industry standards and guidelines concerning pedestrians and cyclists. Traffic management plan preparation, vulnerable road users, risk management plan, safe system approach	Intended to inform Traffic Management Plans, Temporary Traffic Management and best practice recommendations. Provides history of development of guidelines. Safe Systems Approach (elimination, substitution, engineering controls, administrative controls, PPE). Provides detailed best practice principles for pedestrians, cyclists, signs, lighting, speed, safety barriers and fencing. Relates principles to Australian Standards.

New ref#	References	Key Words	Themes	Findings
29	Dhawan K, Tookey J.E, GhaffarianHoseini A., GhaffarianHoseini A (2020) Optimising New Zealand construction consolidation centres: Defining a research framework. The 54th International Conference of the Architectural Science Association (ANZAScA) pp 835 – 844.	Construction Consolidation Centre; Research Framework; Logistics; New Zealand Construction.	Water projects in Auckland NZ, short term supply chain thinking, studies benefits of Consolidation Construction Centre. Research Framework. Transport and energy efficiency. Sustainable logistics.	CCCs in Europe and Continental USA have delivered sterling results towards optimising construction logistics. NZ construction sector is comprised of a large number of Micro, Small and Medium Enterprises (MSMEs) – only 10% have 6 employees or more (2019 data). This paper attempts to define a research framework for investigating the outcomes of CCC based operations within a collaborative project delivery arrangement as an infrastructure logistics delivery vehicle in New Zealand
30	European Transport Safety Council (nd) Preventing Road Accidents and Injuries for the Safety of Employees: Project Handbook (circa 2011)	Work related road safety, Road Safety Management Programs, Business Case Examples, Fleet safety process model	Management leadership, risk assessment, vehicle management. Contains overview, In vehicle safety, Risk Assessment to Training, Fitness to Drive, Safe Commuting to work, Minimizing In-Vehicle Distraction, Road Safety at Work Zones, Tackling Fatigue, Managing Speed	Comprehensive 325-page report. Outlines why employers should address WRRS, provides business case, discusses importance of leadership, models of management, risk assessment and indicators to be monitored. It is a workbook. Provides details of how to manage worker road related safety. Presents country specific case studies.

New ref#	References	Key Words	Themes	Findings
31	Fadiya O., Georgakis P., Chinyio E., Nwagboso C. (2015) Decision – making framework for selecting ICT – based construction logistics systems. Journal of Engineering Design and Technology, Vol 13. No.2 pp 260 – 281.	ICT, Uncertainty, Evaluation, Construction logistics, Implementing, Multi objective attribure decision making	Importance of ICT tracking systems, technologies, benefits, conceptual framework, expected costs, decision tree. Multi criteria attribute analysis. Case Study. Data analysis of projects in UK. Fault Tree.	Many construction managers often advocate optimistic estimate of benefits and cost savings of ICT systems. The paper presents a model that combines decision tree technique, FTA (Fault Tree Analysis) and multi-criteria analysis for the provision of decision support in the selection of ICT for construction logistics. The framework captures the existing problems of logistics in construction process, potential solution that can address the problems through the implementation of ICT systems and the decision-making process in the selection of appropriate ICT solution. The output of the framework will help to make knowledge-based decision in selecting the best ICT system for addressing construction logistics problems
32	Fraser D., Haig J., Heduan M., Limna G. (2017) Crossrail project: logistics management strategy for the Elizabeth line, London. Proceedings of the Institution of Civil Engineers, Civil Engineering, Vol 170, Issue CE5.	Logistics strategy, consistency, logistics manager, defined contractual requirement, vehicle management planning, approved routes, review, engagement and collaboration, road safety programme,	Case study London Cross Rail project, central planning strategy use approved logistics plans, contractor support / engagement –softward e centre collaboration, contracts included logistics coordination planning. Vehicle	The Crossrail project' success was due to 1. providing defined contractual requirements, 2 active engagements with contractors and their supply chain, 3. engaging competent logistics managers to produce an ex-ante logistics plan before construction began, 4. developing an inhouse vehicle management system linked to over 400 users to record vehicle movements, 5. continuous engagement and collaboration advising of authorised routes and scheduling vehicle

New ref#	References	Key Words	Themes	Findings
		information technology, safety compliance, best practice.	management planning system.	movements, 6. Developing a road safety program and encouraging fleet operator recognition scheme (FORS).
33	Gonzalez-Feliu J., Luppino G., Leonardi J. (2011, uploaded 2015) City Logistics Best Practices: a Handbook for Authorities. Sustainable Urban Goods Logistics Achieved by Regional and Local Policies. www.sugarlogistics.eu	Urban freight distribution, policies,	SUGAR. Sustainable urban goods logistics achieved by regional and local policies.	Best practices identified – case studies, Paris, London, Barcelona, Bologna, Binnenstadservice, Zurich, Amsterdam, Stockholm, Bordeaux, Marseille, Dijon Poitiers.
34	Guerlain C., Renault S., Ferrero F. (2019) Understanding Construction Logistics in Urban Areas and Lowering Its Environmental Impact: A Focus on Construction Consolidation Centres. Sustainability, Vol 11, 6118.	urban freight transport; city logistics; construction logistics; comparative analysis; construction consolidation centres (CCC)	Simulation of a CCC – estimated savings. Case studies of construction sites in Luxembourg City, Paris, Valencia and Verona	CCC aims to increase the efficiency and effectiveness of logistics processes by reducing the number of deliveries. CCCs in urban areas can reduce congestion and pollutant emissions due to construction freight movements. Distribution of goods to and from construction sites is different to other urban supply chains and needs more research and attention.
35	Helman S., Delmonte E., Stannard J. (2013) Construction logistics and cyclist safety. Summary report. Published project report PPR640. TRL Transport Research Laboratory.	See 37. Summary report, Construction logistics, cyclist safety.	Summary of Delmonte TRL report.	Executive summary of Delmonte report see technical report 26. Lists 12 recommendations. Explanation of research method.

New ref#	References	Key Words	Themes	Findings
36	Holmes M. (2019). A Review of Intenational Best Practices to Improve Heavy Vehicle Safety in Urban Environments. Extended abstract. Proceedings of the 2019 Australasian Road Safety Conference 25-27 September, Adelaide, Australia.	Heavy vehicle design regulations, accreditation schemes, vehicle safety technology and standards, sustainable logistics practices, training and education	Extended abstract. Reviews best practices internationally. Churchill Fellowship.	Despite progress to improve safety of heavy vehicle industry there are still areas requiring immediate attention to improve safety in urban environments: Ageing heavy vehicle fleet, limited accreditation schemes, logistics planning and Australian Design Rules lag behind international standards.
37	Irizarry J., Karan E. P., Jalaei F. (2013) Integrating BIM and GIS to improve visual monitoring of construction supply chain management. Automation in Construction, Vol 31, pp241-254.	Construction Supply Chain Management, BIM, GIS, Procurements, Logistics, Interoperability	Use of IT to achieve better logistics processes. Visualisation of resource flow incorporated into BIM. Information flow model. Case study of 3 storey building. 3 D model. Logistics costs. Route planning.	The paper presents an integrated GIS (Geographic information systems)-BIM Building information modeling) model (system) for visualizing the supply chain process and actual status of materials (flow of materials, availability of resources) through the supply chain. Actual times can be compared with planned times to provide managers with warning signals and helps identify root causes of delayed materials delivery and where these materials are used.
38	Janne M. (2020) Construction Logistics in a City Development Setting, Linkoping Studies in Science and Technology. PhD Dissertation N0. 2091	Urban construction logistics, Sweden, construction logistics set ups	Managing logistics at construction sites, relationships between construction stakeholders	PhD thesis that develops the concept of construction logistics set ups (CLS). Explores why CLS's are implemented, their services and performances. Presents a framework of developing construction logistics set ups.

New ref#	References	Key Words	Themes	Findings
39	Janne M., Fredrikson A. Construction Logistics governing guidelines in urban development projects. Construction Innovation 19,1.	Construction logistics, construction logistics centres, third-party logistics, governance, stakeholders	Case study – Interviews, site visits, observations, documentation; four stakeholder groups. Construction logistics centre. Guidelines for design of construction logistics solutions for development projects.	There is a lack of research on governance mechanisms for construction logistics solutions. Initiation and utilization of a construction logistics centre (CLC) was analysed from different stakeholder's perspectives so as to suggest governance mechanisms for strategic, tactical and operational levels and to develop guidelines for implementing these governance mechanisms. Findings: There is potential for utilizing CLCs in development projects, with positive effects such as consolidation effects and enhanced planning. Design and implementation of the CLCs must be based on a comprehensive stakeholder analysis, as there are conflicting goals between stakeholders. Governance mechanisms including flexibility in the main contractors' working construction process as we as clearly stated roles, responsibilities and communication must be developed to enhance this potential. There is a need for further multi-stakeholder analysis of construction logistics solutions.

New ref#	References	Key Words	Themes	Findings
40	Janne M., Fredriksson A. (2021) Construction logistics in urban development projects – learning from, or repeating, past mistakes of city logistics? The International Journal of Logistics Management, Vol33, No. 5 pp 49-68.	Construction logistics, Construction logistics Centers, City logistics, Third-party logistics	Activity based costing methodology applied to Swedish urban construction projects. 3-year case study. Utilisation of CLC, drivers and challenges to utilisation. Stockholm Royal Seaport development.	Construction logistics centres (CLC) are often implemented to reduce 3rd party disturbances, but construction companies are motivated by reducing costs. CLC's can be used for Just in Time or as a consolidation point. One of the first studies to analyse CLC utilisation. CLC's can reduce environmental impact and 3rd party disturbances. Studies barriers and drivers for adoption of CLC's.
41	Kumar A., Shoghli O. (2018) A Review of IoT Applications in Supply Chain Optimization of Construction Materials. 35th International Symposium on Automation and Robotics in Construction.	Supply chain management; Internet of things; Material efficiency; Construction.	Real time update on delivery data and material handling. Digital supply chain, augmented reality, RFID.	The digitization of the workforce and built environment can help organisations to manage their performance in terms of cost, time and quality. An array of smart technologies can be used to improve efficiency. Absence of senior management support is a major barrier. Real time data can be uploaded to the cloud. Digital systems are prone to hacking. Dependence on a constant source of power is critical.
42	Le PL., Elmughrabi W., Dao T-M., Chaabane A. (2020) Present focuses and future directions of decision-making in construction supply chain management: a systematic review, International Journal of Construction Management, 20:5, 490-509.	Construction supply chain management, present focuses, future directions, decision making	systematic Literature review methodology. A framework is proposed, considers: the collaborative planning and design with advanced techniques; lean procurement with BIM and third-party	Currently construction supply chain management (CSCM) applications still focus on material and resource management with internal supply chain integration. Strategic decisions related to building partnerships, IT-based planning and logistics-based planning are not conducted at the early phase of planning and design. This reduces the effectiveness and flexibility of the CSC

New ref#	References	Key Words	Themes	Findings
			logistics; and the application of Lean and BIM in construction operations and delivery	ability in responding to uncertainties occurring across the construction phases. The study proposes a framework to leverage the collaborative planning and design with advanced techniques; the lean procurement with BIM and third-party logistics; and the application of lean and BIM in construction operations and delivery
43	Leifgen C., Kujajewski S. (2018) Integrated Digital and Model-Based Construction Logistics Management Based on Lean Thinking Approaches. 35th International Symposium on Automation and Robotics in Construction.	BIM; Construction Logistics; Domain-Specific Model; Lean Construction; Lean Logistics;	Create a digital construction logistics model. Conceptual model of Lean Construction Logistics Management. Example of floor plan 4 takt sections. Masters Thesis.	Construction logistics often does not occur systematically. The paper presents an approach that facilitates a systematic and holistic planning of construction logistics over all project phases based on lean construction principles. Coordination of all domain specific stakeholders (construction logistics planners, site managers, contractors) is essential. Construction logistics planners can create a specific digital construction logistics model (derived from the digital architectural model) which can be used to schedule deliveries, storage areas, and logistics related information (delivery dates, storage areas, escape routes, waste collection points, construction site equipment elements).

New ref#	References	Key Words	Themes	Findings
44	Macharis C., Kin B., Balm S., Ploos van Amstel W. (2016). Multiactor Participatory Decision Making in Urban Construction Logistics. Transportation Research Record: Journal of the Transportation Research Board. No 2547, pp.83-90.	Decision making, urban construction logistics, methodology, stakeholder analysis	Literature review, Methodology, Case study	Construction logistics in urban areas is often neglected despite negative impacts (transportation of construction goods and personnel causes social, economic, and environmental problems) and the potential to make construction logistics more optimal for different stakeholders. Lack of early accurate info on how construction goods will be organized can lead to disputes and disruptions that harm the construction work and surrounding community. MAMCA software is applied on a real construction project in a fictive setting to support real decisions incorporating viewpoints from different stakeholders.
45	Major projects vulnerable road user alignment group. (2018) Heavy vehicle Safety Equipment Specifications - Vulnerable Road User Safety. Guideline.	Safe vehicles, heavy vehicle safety, VRU requirements, major projects	Signage, audible warning devices, blind spot elimination, side under run protection, truck driver training related to VRU	Ensure heavy vehicles have side under-run protection, eliminate front and rear blind spots. Consistent set of mandatory heavy vehicle safety requirements aimed at safety of vulnerable road users. Fulfill contractual requirements. Description of truck configurations and 7 detailed safety requirements.

New ref#	References	Key Words	Themes	Findings
46	McKinsey and Company. (June, 2020) The next normal in construction How disruption is reshaping the world's largest ecosystem. https://www.mckinsey.com/~/media/McKinsey/Industries/Capital%20Projects%20and%20Infrastructure/Our%20Insights/The%20next%20normal%20in%20construction/The-next-normal-in-construction.pdf	Construction, underperformance, construction projects, complexity, logistics, unpredictability, disruption, digitalisation, data driving decision making, advanced logistics management, value-chain control or integration	Research based on conversations with experts and executives, reviews of other industries and their transformative journeys, survey of 400 global industry leaders, formulation of future scenarios.	Construction is the biggest industry in the world, and it is not performing well. Changing characteristics and emerging disruptions will drive change and transform ways of working. Consulting report on the changes that are occurring for the industry. Introduces the idea of an industry ecosystem that is complex, fragmented and project based. Presents results of their survey. High level business strategy advice. Does not address safety issues directly but recommends investment in human resources – education and training.

New ref#	References	Key Words	Themes	Findings
47	Morel M., Balm S., Berden M., Ploos van Amstel W. Governance models for sustainable urban construction logistics: barriers for collaboration. City Logistics 2019. Transportation Research Procedia 46 (2020) 173-180.	construction logistics, city logistics, public procurement, tendering, governance	Collaborative governance, drivers for – barries to – case study, 36 interviews, semi structured, CIVIC Handbook. Amsterdam case study.	Key findings are that governance of construction logistics are hindered by both formal (political agenda, lack of direction, functional silos and domain demarcation, inadequate instruments and policies, poor information systems) and informal barriers (lack of sense of urgency, conflict zones and values, lack of trust among direct actors involved, lack of communication and sharing information, insufficient knowledge of the other function). According to the collaborative governance model, one or more drivers are necessary for collaboration to start (improving collaborative governance) - leadership, consequential incentives, interdependence between public and private actors, and uncertainty about the problem and its possible solutions. A collaborative ethic of sharing data regarding costs, benefits and risks of innovative solutions is needed to create innovative solutions. Constructive communication between public and private actors, public authority, and private actors within the supply chain is a necessity.
48	Morgan G. (2019) Construction and congestion. Focus, October, www.ciltuk.org.uk	Consolidation centres, deliveries timing, modern	Grey Literature. Journal article. Construction logistics,	Use of consolidation centres to maximise capacity of vehicles and reduce number of vehicles. Retime deliveries. Use

New ref#	References	Key Words	Themes	Findings
		modular construction, digitally designed components, drones, robotics	reduce environmental impact.	modular construction techniques. Use big data to run scenarios to optimize fabrication and deliveries. Manage inventory to manufacturing precision. Use of drones. Use of robotics and self-climbing technologies.
49	National Heavy Vehicle Regulator (June 2021). National Heavy Vehicle Accreditation Scheme (NHVAS). Business Rules and Standards. Version 3.1. www.nhvr.gov.au	Maintenance management accreditation, mass management accreditation, fatigue management accreditation.	HVAS objective is: improve road safety, increase transport industry productivity through good risk management practice, improve participant efficiency.	Presents business standards and rules for heavy vehicles. Outlines accreditation requirements for maintenance management, mass management and fatigue management.
50	NHVR (2022). Safety Management Systems -fact sheet. www.nhvr.gov.au/sms	Safety Management Systems framework	Guidance on safety policy and documentation, safety risk management, safety assurance, safety promotion and training.	Fact sheet from NHVR on Safety Management Systems (SMS)-a systematic approach to managing safety, including necessary organisation structures, policies and procedures, integrated throughout the business wherever possible. SMS framework includes safety policy and documentation, safety risk management, safety assurance, safety promotion and training

New ref#	References	Key Words	Themes	Findings
51	Nicholls H., Rose G., Johnson M., Carlisle R. (2017) Cyclists and Left Turning Drivers: A Study of Infrastructure and Behaviour at Intersections. Australian Transport Research Forum 2017, Proceedings 27-29 November 2017, Auckland New Zealand.	Driver, cyclist, behaviour, crash, left turn.	Mixed methods study, desk analysis, crash data, roadside video camera. Infrastructure type.	Studies 4 types of road infrastructure for cyclists – advanced stop box, advanced stop line, continuous bicycle land and Sharrow. The advanced stop line was most appropriate for left turn negotiation. The advanced stop box was least appropriate for left turn negotiation. Sharrows were considered less appropriate for left turn negotiation.
52	Nolz PC. (2020) Optimising construction schedules and material deliveries in city logistics: a case study from the building industry. Flexible Services and Manufacturing Journal; 33:846-878.	Construction logistics; Project scheduling: Inventory routing.	Theory, Data analysis	Mixed integer optimization model (CPLEX) applied to a project in Vienna. Proposes a construction logistics planning decision support tool. Consolidation and route optimization can increase productivity.
53	Piecyk M, Allen J, Woodburn A. (2021) Construction Logistics Briefing Report. Technical report: CUED/C-SRF/TR15. Centre for Sustainable Road Freight. ISSN Number: 2054-4081	Supply chain construction industry, mitigation of impacts, sustainability targets	Includes a section on negative impacts of construction and construction logistics (section 6.p.94)	Detailed description of UK construction industry. Case studies of major companies sustainability strategies. Discusses measures available and that can be implemented to enhance sustainability and safety of construction and its related logistics and transport activities. Encourage companies to join CLOCS and fleet operators to join FORS.

New ref#	References	Key Words	Themes	Findings
54	Procore (2022). How we build now. Tracking technology in Asia Pacific Construction in 2022. Benchmark report. Procore Technologies Inc	Construction industry sentiment, technology, digital transformation,	Benchmarks technological advancements and business practices-Malaysia, New Zealand, Philippines, Singapore, and Australia. Report notes Australian companies will need to ramp up their technology investment.	Survey of 1,138 decision makers involved in construction in Australia, NZ, Malaysia, Singapore and Philippines and Singapore. Around 1/3 of respondents used paper to capture, tack and manage data.
55	Ranieri L., Digiesi S., Silvestri B., Roccitelli M. (2018) A review of last mile logistics innovations in an externalities cost reduction vision. Sustainability;10, 782.	Urban logistics; last mile delivery; smart cities; transport externalities; Systematic Literature Review.	Systematic review. Innovative contributions classified into 5 categories: innovative vehicles, proximity stations or points, collaborative and cooperative urban logistics, optimisation of transport management and routing, innovations in public policies and infrastructures.	Innovative vehicles, urban consolidation centres, optimization of transport management and innovative public policies can minimize negative externalities. A smart city will use innovative approaches for last mile delivery. Industry 4 paradigm.

New ref#	References	Key Words	Themes	Findings
56	Road Safety Victoria (2020) Truck and Bicycle Riders Crash Data Analysis, Jan 2014 to Jun 2019 Victoria Australia. VicRoads, Department of Transport, Victorian State Government.	Victorian truck cyclist crash data. Types of crashes, prevalence, LGA, age	Data base, crash classifications, Truck and Bicycle Crash Data, statistical analysis	Statistics of crash numbers-metro truck and bicycle crash locations - Crash (truck and bicycle) locations highest in Melbourne LGA (13 between 2014-2019), followed by Yarra, Stonnington and Maribyrnong LGAs (4 each). Between 2014-2019, there were 38 serious injury crashes and 8 fatalities in metro and 3 serious injury crashes and 7 fatalities in the rural/regional areas.
57	Said H., El-Rayes K. (2011) Optimizing Material Procurement and Storage on Construction Sites. Journal of Construction Engineering and Management, Vol 137, no. 6 pp 421 – 431.	Materials procurement; Inventory control; Dynamic layout planning; Optimization; Genetic algorithms.	Efficient planning of material procurement and storage on sites can significantly improve construction productivity and project profitability	Construction logistics planning model integrating / optimising storage / layout and procurement. Construction logistics cost – optimisation. Case study office blocks.
58	Sezer A., A., Fredriksson A. (2020) The transport footprint of Swedish construction sites. IOP Conf. Ser.: Earth Environ Sci. 588 042001	Construction logistics setups, GHG, transport impact	Transport patterns of construction projects. Time pressures in construction projects.	Secondary data analysis of construction projects. Considers transport patterns and GHG emissions from construction projects. The paper reports that the average number of transports per flat is 6-81 transports and transports are a strong indicator of GHG emissions and a negativity of construction projects. Paper reports construction logistics setups can reduce construction traffic significantly or can be used to change the traffic pattern of projects.

New ref#	References	Key Words	Themes	Findings
59	Thompson R.G., Hassall K. (2014) Implementing High Productivity Freight Vehicles in Urban Areas. 1st International Conference Green Cities 2014 – Green Logistics for Greener Cities. Procedia – Social and Behavioral Sciences 151, pp318-332.	Urban freight transport; High Productivity Freight Vehicles (HPFVs); urban freight networks; Performance Based Standard Vehicles	Container study from Port of Melbourne – impact of HPFV. Vehicle surveys by commodity, estimated savings. Intelligent Access Program.	Substantial benefits can be achieved by the take-up of Performance Based Standards (PBS) vehicles in urban freight networks. Case studies show a lowering of several key freight exposure metrics, which involve kilometres, trips, task travel time and vehicle numbers. Productivity improvements in general have ranged between 20% to 50% for particular PBS vehicle types, seeded into specific network operations. High productivity freight vehicles (HPFV) are currently restricted to high standard roads, however case studies show PBS and HPFVs can provide substantial savings in transport operating costs for common types of urban freight networks. IAP (intelligent Access Program) which uses GPS allows vehicle and trailer identification as well as the position to be tracked allowing spatial/ route compliance.
60	Transport for London (2021). Construction Logistics Planning (CLP) Guidance Version 1.2 (April). TfL	Construction, Logistics, Plans, Guidelines	CLP Guidance, CLP Introduction, Policy, Writing a CLP, Planned Measures.	Construction logistics planning guidelines – handbook. Covers policy, how to write a CLP and planning measures. Focusses on construction supply chains and reducing impact on road network.

New ref#	References	Key Words	Themes	Findings
61	Transport for London (nd) Construction Logistic Planning Guidance.	Logistics, planning, community considerations, traffic management, construction traffic, routes, policies, accreditation, safety, standards, local authorities	How to write a construction logistics plan, policy and implementation measures. Methodology	A 52-page document explaining in detail how to create a construction logistics plan – step by step. Could be described as a "cook book" on how to do write a CLP.
62	Transport for London (TfL) (2012) Construction logistics and cyclist safety, Published Project Report 2, Transport Research Laboratory.	Construction logistics, cyclists, Construction Logistics Plan	Major report which provides solid basis for CLOCS – statistical analysis, recommendations – key reference	A key 173-page research report from TRL. Road risk is viewed as less important than general health and safety risk, construction traffic appears overrepresented in collisions with cyclists, lack of ownership of road risk by clients and principal contractors, data on collisions and near misses on the road not generally collected on construction projects, lack of awareness about road risk by construction industry, FORS and CLP might be used to manage road risk, delivery time slots may contribute to driver pressure, route planning is difficult because of transitory nature of sites, visibility of cyclists around construction vehicles is still poor, high potential for driver error. Report concludes with 12 detailed recommendations.

New ref#	References	Key Words	Themes	Findings
63	U.K. Department for Transport (2014) Quiet Deliveries Good Practice Guidance – Key Principles and Processes for Construction Logistics.	Local authority, planning, transport, stakeholders, construction logistics, operators, deliveries, modernisation, fleet upgrades, driver behaviour, environmental health, cost, partnership, community engagement	Handbook – guidance on managing freight deliveries, stakeholder involvement, engagement, best practice case studies	Guidelines for out of hours deliveries (night times) from a construction logistics perspective. Step 1 – what are the motivators, Step 2 working informally with stakeholders, Step 3 Scoping Quiet Deliveries Scheme, Step 4 community engagement, Step 5 Develop memorandum of understanding, Step 6 – implementation. CILT UK concluded it was a win-win for the logistics sector, customers and environment.

New ref#	References	Key Words	Themes	Findings
64	Victorian State Government. Vulnerable Road User Initiatives. 23 Feb 2022. Powerpoint presentation. Major Transport Infrastructure Authority (MTIA).	Construction and public safety CAPS-safer roads and routes, safer drivers, safer behaviours, safer vehicles.	Safety equipment on vehicles, driver training, implementation strategy and challenges, education.	MTIA presentation related to VRU initiatives. Lists typical contract requirements: safety equipment on vehicles- under Heavy Vehicle National Law the developer must ensure all HV have side under run guards fitted (unless this interferes with intended function), front, rear and side blind spots completely eliminated or minimized-through direct and indirect vision aids, sensors and audible or visual driver alerts, equipment with audible means of warning of a left manoeuvre, prominent signage on the vehicle warn cyclists and other road users of dangers passing the vehicle on the inside or of getting too close to the vehicle; driver training (some aspects-on bike) not accepted by industry). Major contracts now require a VRU coordinator. Community education is also important.
65	Walton C (ed) nd. Understanding CLOCS: A practical guide. Road Transport Media.		How FORS and CLOCS fit together, CLOCS compliant truck	Provides an overview of CLOCS for the construction industry. The Fleet Operator Recognition Scheme (FORS) and the Construction Logistics and Cyclist Safety Scheme (CLOCS) go hand -in-hand, as FORS helps the operator demonstrate its adherence to the CLOCS standard. Warning signs, side

New ref#	References	Key Words	Themes	Findings
66	Whitlock K., Abanda F. H., Manjia M.B., Pettang C., Nkeng G.E. (2021) 4D BIM for Construction Logistics Management. Civil Engineering Vol 2, pp 325 – 348.	BIM; 4D BIM; construction; logistics; management	Building information modelling (BIM) applied to construction logistics management.	Use of BIM applied to construction logistics management – 6 in-depth interviews with experts. 4D BIM incorporating logistic elements. BIM projects in Greater London. Specialist logistics contractor. Lack of training the main barrier to uptake.
67	Ying F, Tookey J, Roberti J. (2014) Addressing effective construction logistics through the lens of vehicle movements. Engineering, Construction and Architectural Management Vol. 21 No. 3, pp. 261-275.	New Zealand, Construction logistics, Construction supply chain management CSCM), Vehicle movements	Case study approach-onsite observations and interviews. Qualitative and quantitative data	Data analysis suggested that cost-related factors affecting the construction logistics, both monetary and non-monetary factors were not measured and largely ignored, especially the possible environmental and/or social impact occurred by the truck movement. Factors in the service-related sector were insufficiently managed in the observed site. The main contribution to inefficient construction logistics are related to understanding and implementing CSCM. It is noticed that there is inadequate awareness of CSCM and logistics efficiency largely due to lack of commitment from the management level and skills at the operational level.

New ref#	References	Key Words	Themes	Findings
68	Ying F.J., O'Sullivan M., Adan I. (2021) Simulation of vehicle movements for planning construction logistics centres. Construction Innovation Vol 21 No4. Pp 608-624.	New Zealand, Supply chain management, Integration, Simulation, Construction industry, Logistics management	Case study approach using computer simulation to improve logistics centres – scenarios using vehicle movement data. Sites in Auckland for logistic centres.	Materials supply in an important element in construction operation and a major factor affecting the quality of construction projects. The paper develops a simulation framework for examining potential improvements of logistics performance using logistics centres. Findings: ideal location of a logistics centre is identified using vehicle movements data collected on the site. Potential improvements of the planned centre are then evaluated by simulating various scenarios of vehicle movements -results show that using a logistics centre will reduce waste for the construction project considered. Creating a logistics centre can improve construction logistics performance by consolidating and optimizing both on-site and off-site logistics, especially when site construction is prohibitive.
69	Deloitte. Construction and demolition waste management in France v2. Sept 2015. 2014 Deloitte	Construction demolition waste (CWD) management France5555	Statistics on waste in France, obstacles to sustainable CWD management, drivers to sustainable CWD management.	Definitions of waste treatment operations, legislation on CDW in France, Waste management plans (WMP) and strategies, legal framework for sustainable CDW, CDW management initiatives, drivers/barriers to increase CDW recycling. Stakeholder management.

New ref#	References	Key Words	Themes	Findings
70	Singer L. (2022) Building in the Dark-Construction Supply Chain Risk: Challenges, Responses & Opportunities. Research report-white paper. Felix Group Holdings and Entwine. Note reference in MUARC Author Felix and Entwine	Construction supply chain risk, risk management	Construction industry challenges opportunities,	Research report – results of survey of construction industry on risks. Online survey and follow up face to face interviews. List of challenges, opportunities. Report link in National Road Safety Partnership Program, Monash University, Accident Research Centre. Asset owners, builders and managers have a unique position due to their heavily service-focused supply chains, often with a high concentration of **high-risk** subcontractors. In particular, project-based organizations also have to rapidly **generate** and **degenerate** their supply chains. Much of the publicly available research and information available on supply chain risk mitigation is focused on sectors with more stable supply chains, such as manufacturing. We wanted to provide a deeper understanding of risk in sectors with more **dynamic supply networks**.

New ref#	References	Key Words	Themes	Findings
71	Construction Logistics and Community Safety (CLOCS). (Jan 2019) CLOCS Standard version 3 Ensuring the safest construction vehicle journeys. www.clocs.org.uk.	Construction logistics community safety, CLOCS, standard	Ensuring safest construction vehicle journeys	Describes CLOCS national industry standard for regulators, clients, principal contractors and fleet operators. 463 people killed or seriously injured in collisions with HGV's in 2016 in UK. 38% of peak hour traffic in towns was construction related. Lists regulator responsibilities, client duties, principal contractor duties, fleet operator duties and references on implementation – guides, compliance, handbook, tool kits.

New ref#	References	Key Words	Themes	Findings
72	National Road Safety Partnership Program (nd) Safely Delivering The Growing Urban Freight Task, Learning from International Best Practice. PPT of Webinar https://cdn-s3-nrspp-2020.s3.ap-southeast-1.amazonaws.com/wp-content/uploads/sites/4/2020/04/29164556/NRSPP-Webinar-Safely-Delivering-the-Growing-Urban-Freight-Task-Learning-from-International-Best-Practice-PPT.pdf	Urban freight task, international best practice	Current issues and challenges, accreditation schemes, standards, vehicle safety. Training and awareness, sustainable urban logistics	Why isn't preventing needless deaths of hundreds of people on our roads our priority? Higher operating standards, better route planning, driver training , direct vision vehicle cab designs, new types of safety technology. Route planning should consider sensitive land-use areas • Night deliveries for urban waste and distribution • Consolidation for construction materials deliveries • Utilisation of alternative transport modes for infrastructure projects • Planning authorities can influence safer outcomes through conditions of approval for developments and infrastructure projects

New ref#	References	Key Words	Themes	Findings
73	Roso, V., Altuntas Vural, C., Abrahamsson, A. et al (2020). Drivers and Barriers for Inland Waterway Transportation. Operations and Supply Chain Management, 13(4): 406-417. http://dx.doi.org/10.31387/oscm0430280	inland waterway transportation, intermodal transportation, modal shift, drivers, barriers, Sweden	Sustainability, energy efficiency, reduction of congestion on roads by use of inland water ways.	Case study of 6 companies in northern Netherlands (Drachten) 3 of which were in construction materials delivering across the country. They were not in favor of using IWW because of ad hoc nature of solutions. It is important to integrate intermodal transport solutions with supply chain decisions. Cost competitiveness is critical but changing the mindset of the actors involved is significant. Paper suggests a well conducted pilot project to make stakeholders implement IWT.

New ref#	References	Key Words	Themes	Findings
74	Asanka W.,A., Ranasinghe M. (2015) Study on the impact of accidents on construction projects. SECM 6th International Conference on Structural Engineering and Construction Management, Kandy, Sri Lanka, 11-13 December: 58-67.	accidents, accident forecast	Literature review on causes of accidents and resultant costs in Singapore, Australia.	Identifies critical causes and effects of construction site accidents. Four issues from accidents are project cost, time scope and company reputation. Considers onsite accidents only.

New ref#	References	Key Words	Themes	Findings
75	Rogerson S., Santen V., Svanberg M., Williamsson J., Woxenius J. (2019) Modal shift to inland waterways: dealing with barriers in two Swedish cases. Int J Logistics Research and Applications, DOI:10.1080/13675567.2019.1640665.	Modal shift; inland waterway transport; barriers; inland waterways.	Strategies to manage barriers to using inland waterway transport. Uses 2 cases studies of Swedish entrepreneurs.	Paper discusses how entrepreneurs can overcome barriers to making a modal shift to inland waterway transport. Multiple stakeholders are involved and identifying regulatory barriers are a significant factor.

New ref#	References	Key Words	Themes	Findings
76	Specht P., Bamler J-N., Jovic M., Meyer-Larsen N. (2022) Digital Information Services Needed for a Sustainable Inland Waterway Transportation Business. Sustainability; 14, 6392. https://doi.org/10.3390/su14116392	digital information services; inland waterway transport; digitalization; IWT operators. sustainable transportation	River information services require 4 key technologies: Vessel tracking and tracing, Notices to skippers, electronic reporting international and inland electronic chart display and information system.	Results of a limited survey (n=84). Lack of available berth spaces and time-consuming preannouncement and reporting obligations. Operators do not have sufficient knowledge of information services available. Online survey of skippers, transport planners, managers. Identifies important information needs of stakeholders.

New ref#	References	Key Words	Themes	Findings
77	Vahdatikhaki F., Langari SM., Taher A., El Ammari K., Hammad A. (2017). Enhancing coordination and safety of earthwork equipment operations using Multi-Agent System. Automation in Construction 81: 267–285	Multi-Agent Systems Earthwork equipment Real-time Location Systems Simulation Safety	Location based guidance systems using GPS and Automated Machine Control and Guidance Systems. Telematics on earthmoving equipment and Multi-Agent systems to prevent construction equipment collisions on construction sites.	Presents detailed over arching framework for a digital information systems (Multi-agent) to improve productivity and safety on construction sites.

New ref#	References	Key Words	Themes	Findings
78	Amer M., Mustafa A., Attia S. (2019) Conceptual framework for off-site roof stacking construction. Journal of Building Engineering; 26: 100873.	Prefabrication, modular construction, lightweight construction, decision making, urban densification	Compact cities for sustainability, paper provides decision making framework for roof stacking construction to support densification.	Paper develops classification for roof stacking construction methods and a multidisciplinary framework for roof stacking decision making. Considers loading and transporting roof stacking modules. Logistics factors include large tonnage cranes also loading and transfer of demolition waste.

New ref#	References	Key Words	Themes	Findings
79	Pisz I., Lapunka I. (2016) Transportation services as specific logistics projects for oversized cargo in Poland. In Bak B (ed.), Transport development challenges in the twenty-first century. Proceedings of the 2015 TranSopot Conference	Transportation-freight forwarding-logistics sector; Transportation service; Logistics project; Oversized cargo; Oversized load; Logistics service provider	Characteristics of oversized cargo transportation – based on Polish regulations – defines oversize for all transport modes.	Proposes adopting a project management approach to the movement of very large objects used in power plants and construction sites.

New ref#	References	Key Words	Themes	Findings
80	Szczucka-Lasota, B. City logistics: influence of oversized road transport on urban development. Scientific Journal of Silesian University of Technology. Series Transport. 2017, 97, 157-165. ISSN: 0209-3324. DOI: https://doi.org/10.20858/sjsutst.2017.97.14.	City logistics; oversized transport; load distribution	City logistics – influence of oversized road transport on urban development	Urban growth projected to increase more oversized road transport and facilities for oversized loads. Describes Polish definition of oversized road vehicles (loads > 16.5 m in length, 2.55 m width, 4 m height and 40 tons mass)

New ref#	References	Key Words	Themes	Findings
81	Caris A., Limbourg S., Macharis C., van Lier T., Cool M. (2014) Integration of inland waterway transport in the intermodal supply chain: a taxonomy of research challenges. Journal of Transport Geography; 41: 126-136.	Intermodal transport Inland navigation Research challenges Integration Supply chain	Stimulate use of inland water transport (IWT) in Europe. An environmentally friendly transport mode – less congestion, long term European priority. System wide model for IWT. Integration of operational planning systems. Supply chain and bundling networks. Costs.	Identifies research opportunities to enable integration of inland water transport into the supply chain.

New ref#	References	Key Words	Themes	Findings
82	Allen J., Browne M., Woodburn A. (2014) London Freight Data Report: 2014 Update. Planning and Transport Department University of Westminster for Transport for London	London, logistics, efficient movement of goods, heavy goods vehicles (HGV) Light Good Vehicles (LGV), killed, seriously injured.	Industrial HGV Task Force, vehicle safety, Fleet Operators Recognition Scheme (FORS), road freight activity patterns in London.	London freight and logistics industry annual survey results. Data on freight movement by mode, vehicle type, fatalities and injuries 1990 to 2012.

New ref#	References	Key Words	Themes	Findings
83	Bu F., Nachtmann H. (2021) Literature review and comparative analysis of inland waterways transport: “Container on Barge”. Maritime Economics & Logistics https://doi.org/10.1057/s41278-021-00195-6	Container on barge · Inland waterways transport (IWT) · Maritime transportation · Intermodal transportation · Literature review · Comparative analysis	Detailed literature review of container on barge (COB).	135 COB peer reviewed articles reviewed and analyzed. COB is a mechanism to reduce emissions, maintenance and congestion on road networks around the world. Critical success factors – infrastructure, container growth market , navigability of inland waterways, terminal efficiency, hinterland access, enabling govt policies, modal competition, barge utilization, collaboration among operators and information sharing.

New ref#	References	Key Words	Themes	Findings
84	Steel Australia. (March 2006) The New Southern Cross Station. The iconic redevelopment of Melbourne's Spencer Street Station.	Construction challenges; design; Engineering the structure; Structural system and design; Innovation; temporary works, Roof system	Redevelopment of a live operating major railway station. Rapid closedown at end of each period of construction and rapid remobilization at beginning of next.	Explanation of construction process and challenges. Use of barges to transport 54 spine trusses that were manufactured in Geelong, Launceston and Tomago near Newcastle NSW. The trusses were transported by large barges over water to the South Wharf. They were then taken by road 5km in the middle of the night and lifted directly into their final position. Use of innovative transport.

New ref#	References	Key Words	Themes	Findings
85	Song L., Eldin NN. (2012). Adaptive real-time tracking and simulation of heavy construction operations for look-ahead scheduling. Automation in Construction 27: 32–39.	Real-time Simulation Tracking Construction operations Look-ahead scheduling	Real time tracking of operational data which is used to update a discrete event simulation model. Use of sensors for location, motion and image to capture data for lookahead scheduling.	Automated data collection, modelling, verification and validation processes can help end users focus on essentials of project scheduling and control rather than simulation modeling itself. Prototype system developed and applied to a road project widening and geofencing at an asphalt plant.

New ref#	References	Key Words	Themes	Findings
86	Helman S., Christie N., Ward H., Grayson G., Delmonte E., Hutchins R (2014). Strategic review of the management of occupational road risk. UCL (Centre for Transport Studies University College London) and TRL (Transport Research Laboratory).	Work related road safety; occupational road risk; vehicle fleet; opportunities and barriers;	Stakeholder interviews. Management of occupational road risk(MORR) is a key topic in road safety. Injuries and deaths from work related driving represents a substantial public health burden	Occupational road risk needs to be embedded strategically at board level in a business – as part of governance structures. Coordinate data bases such as RIDDOR(Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013, UK Health and Safety Executive). Change policy so that employers have to report on RIDDOR. Raise awareness and embed good practice. Monitoring and evaluation using telematics to improve data including smaller fleets.

New ref#	References	Key Words	Themes	Findings
87	Laby NC., Arokiaprakash A., Indira M., Manivel S. (2016) Analysis of Factors Influencing Procurement Process and Proposing a Decision Making Module for Construction Projects on Multi-Site Context. International Journal of Applied Engineering Research ISSN 0973-4562 Vol 11(9): 6689-6693.	Centralized model, Decentralized model, Procurement	Uses ABC inventory analysis to determine if centralized or decentralized purchasing is the most effective	ABC inventory classification is found to be most preferred inventory control method in the construction industry based on a questionnaire. A class items best monitored with a centralized model while decentralized model reduces lead times and increases flexibility. Procurement strategy is unique for every building project.

New ref#	References	Key Words	Themes	Findings
88	Victoria Auditor General (2007). Chapter 3 Management of Southern Cross Station PPP in Audit of 2 Major Partnerships Victoria Projects. VAGO.	Procurement, PPP, Rail Terminal Re development, VAGO, Southern Cross Station Authority (SCSA)	Auditors review of the management of Southern Cross Station as a PPP. KPI's. Audit.	The project ran over time and over budget. One of the factors contributing to the delay was logistical and stakeholder interface issues arising due to construction activity occurring while the station remained fully operational.

New ref#	References	Key Words	Themes	Findings
89	Chileshe N., Rameezdeen R., Hosseini MR., Lehmann S., Udeaja C. (2016) Analysis of reverse logistics implementation practices by South Australian construction organisations. International Journal of Operations & Production Management Vol. 36 No. 3, 2016 pp. 332-356	South Australia, Supply chain management, Construction industry, Reverse logistics, Practices, Mixed methodology	Identifies the practices that have the potential to promote Reverse Logistics practices that work well in construction and that can be mapped to all stakeholders.	Practices facilitating deconstruction are the most important. Next the use of salvaged materials in new construction. Designing for reverse logistics and deconstruction is important for designers. Availability of salvage materials in the market influence their use in new construction.

New ref#	References	Key Words	Themes	Findings
90	Sezer, A.A.; Fredriksson, A. Paving the Path towards Efficient Construction Logistics by Revealing the Current Practice and Issues. Logistics 2021, 5, 53. https://doi.org/10.3390/logistics5030053	construction sites; construction transport; efficiency; turnaround times	Investigate transport patterns of construction material deliveries, including turnaround times. Data from 13 Swedish construction sites. Rare study documenting material delivery data at construction sites.	The type of project and construction method can determine the types of materials and how they are delivered over a project's completion span. The type of project, construction method and type of contract will affect the delivery pattern of materials.
91	Pushpamali NNC, Agdas D and Rose TM (2020) Strategic Decision Making in Construction Supply Chains: A Comparison of Reverse Logistics Strategies. Front. Built Environ. 6:593372. doi: 10.3389/fbuil.2020.593372	bridge construction, construction industry, construction supply chain, environmental impact, life cycle assessments	Alternative reverse logistics (RL) strategies provide more environmental benefits than recycling and landfill.	A life cycle assessment with ReCipe2016 mid-point and end point assessment was applied to a bridge construction supply chain. Different end of life scenarios such as reuse, remanufacture, recycle, and landfill scenarios were assessed using SimPro. Re-use has least environmental impact.

New ref#	References	Key Words	Themes	Findings
92	Chileshe N., Rameezdeen R., M. Reza Hosseini M.R., Lehmann S (2015),"Barriers to implementing reverse logistics in South Australian construction organisations", Supply Chain Management: An International Journal, Vol. 20 (2):179 – 204 Permanent link to this document: http://dx.doi.org/10.1108/SCM-10-2014-0325	Construction industry, Barriers, Reverse logistics, South Australia, Correlation analysis & Descriptive statistics, Supply chain management, SCM	Best practices and drivers that could be used as a “road map” for developing appropriate solutions for the successful implementation of reverse logistics. Literature review and 49 questionnaires.	Barriers to reverse logistics, lack of incorporation of salvaged materials by designers, regulation restrictions on the use of recovered materials and components, legal liabilities, higher costs and longer time deconstructing a building.
93	Maxwell D., Couper R. (2022) Construction tracking: implications of logistics data. Construction Innovation. Vol. ahead-of-print No. ahead-of print. https://doi.org/10.1108/CI-06-2021-0122	Logistics, Tracking, Construction, Prototype, Bluetooth, Data	Construction logistics traditionally considered a site management activity at the back end of projects. Empirical case study to capture data across manufacture, delivery and assembly of cross laminated timber.	Tracking of expanded logistics data can improve backend performance in subsequent projects and inform projects unique front end design phase. Incorporation of tracking technologies into a broader range of construction activities provides invaluable data for improvement across projects.

New ref#	References	Key Words	Themes	Findings
94	Jang J., Ahn S, Cha SH., Cho K., Koo C., Kim TW. Toward productivity in future construction: mapping knowledge and finding insights for achieving successful offsite construction projects. Journal of Computational Design and Engineering, 2021, 8(1), 1–14	offsite construction; prefabrication; modular construction; literature review	Review Article of 83 papers on operation level papers of offsite construction (OSC)	Studies on transportation and maintenance phases of OSC have started only recently.
95	Gharehbaghi K., McManus K., Robson K. (2019) Minimizing the environmental impacts of mega infrastructure projects Australian public transport perspective. Journal of Engineering, Design and Technology Vol. 17 No. 4, 2019 pp. 736-746	Australian public transport infrastructure, Environmental impacts, Mega transport infrastructure (MTI), Sydney Metro	Innovative approaches to reduce environmental impacts during construction of mega transport projects. Case study of Sydney Metro.	6 elements to reduce environmental impact – materials implications, logistics planning optimization, intelligent compaction, reestablishing vegetation, network management and maintenance optimization. Network management can reduce trips and congestion and minimize GHG.

New ref#	References	Key Words	Themes	Findings
96	Sochon P., Stuckey R., Murray W., Kwok A. (2013) Corporate Road Safety: an opportunity to reduce the road toll through integrated Government policy. Journal of the Australasian College of Road Safety – Vol24 No.3: p56-60.	Corporate road safety; work health and safety, policy and practice, Australia, research, Chain of responsibility	Road travel is biggest cause of worker fatalities in most westernized countries. Work Health and Safety Schemes could be applied to work road safety to reduce road toll.	A pan – Australia code of practice which addresses work related road risk should be written and implemented. Create a national work-related risk management memorandum of understanding between State and Commonwealth WHS agencies. They present a unique opportunity to reduce injury burden for work related road accidents.

New ref#	References	Key Words	Themes	Findings
97	Stuckey R., Pratt SG., Murray W. (2013) Work-related road safety in Australia, the United Kingdom and the United States of America: an overview of regulatory approaches and recommendations to enhance strategy and practice. Journal of the Australasian College of Road Safety – Vol24 No.3: p10-20	Regulatory approaches, work related road safety (WRRS); gaps in policy, management and research, Chain of responsibility	WRRS review of studies in Australia, UK and USA.	Integrating management of WRRS into regulatory and non-regulatory OHS initiatives would foster and support collaborative research and practice communities and create a comprehensive evidence base for future programs. The review found significant and consistent gaps in WRRS policy and research. In Australia (and the U.S.) managing and regulating WRRS is complicated because responsibility for legislation, regulation and enforcement is divided or shared among federal, state and territorial jurisdictions.

New ref#	References	Key Words	Themes	Findings
98	Bilal ML., Irfan M., Anwaar A., Labi S., Sinha KC. (Sept 2010) Joint transportation research program FHWA/IN/JTRP-2010/12 A Synthesis of overweight truck permitting. Final Report. IDOT Division of Research, Purdue University, W. Lafayette.	Overweight and Over Size Trucks, Overweight/Oversize Truck Permitting, Pavement Damage Cost.	Literature review, internet search, phone interviews, state of practice of truck weight permitting in Indiana compared with neighbouring states in US, fee amounts, fee structure, ease of permit acquisition process, fee structure, revenue	The study found that "while upper thresholds (dimensions and weights) for legal trucking operation are generally the same for each state, those for extra legal dimensions and weights vary considerably". There is great variability in permitting criteria and truck permit fees across the states. Fees incurred by truckers across states are influenced by factors such as trip circumstances, permitting criteria, trip frequency and distance. Additional payload was reported to increase pavement deterioration. Data suggests having more axles on a truck reduces pavement deterioration and hence damage repair cost. In terms of revenue neutrality, it was noted highway agencies that had switched to an annual flat fee permit system as compared with a single-trip permit system benefited from cost savings due to reduced monitoring efforts of truck trips although they had lost significant revenue overall.

New ref#	References	Key Words	Themes	Findings
99	McElhanney (2018). Improved roundabout safety for heavy vehicles and vulnerable users, Sicamous, BC. TAC Road Safety Awards.	Roundabout, safe and effective pedestrian and cyclist integration, safety improvements, VRUs, heavy trucks, oversize vehicles, innovation	Stakeholder engagement; innovation; acceptance of roundabouts by communities, the trucking industry and general public.	The project described in the document won the 2017 MoTI Deputy Minister's award of excellence for design. It describes a roundabout built with stakeholder consultation, safety design features and innovation to accommodate VRUs, oversize permit vehicles, trucks and heavy vehicles. The design reduced conflict nodes from 61 pre-project to 16. Safety features were incorporated in the design.

New ref#	References	Key Words	Themes	Findings
100	Guerin TF (2017) Evaluating expected and comparing with observed risks on a large-scale solar photovoltaic construction project: A case for reducing the regulatory Burden. Renewable and Sustainable Energy Reviews 74:333–348	Governance Risk management Renewable energy Solar photovoltaic (SPV) Construction management Planning approvals Environmental management Utility scale solar energy (USSE) Constraints Regulatory burden	The nature of environmental and community risks to be expected on Australian construction sites.	Large number of approval conditions set by regulatory authorities are arguably excessive compared with risk profile. The risks of greatest concern; dust control, optimizing vegetation growth under the panels, waste management, lack of common understanding for local job opportunities. Managing end of life packaging materials was an unexpected risk. Reduce approval constraints, reduce red tape will enhance utility scale solar energy projects.

New ref#	References	Key Words	Themes	Findings
101	Alizadehsalehi S., Yitmen I., Celik T., Arditi D. The effectiveness of an integrated BIM/UAV model in managing safety on construction sites. Int Journal of Occupational Safety and Ergonomics. Vol 26(4):829-844.	Construction safety management; four-dimensional visualization; building information modeling; unmanned aerial vehicles.	Potential hazard identification; four dimensional BIM/UAV enabled safety management model presented. Survey of construction professionals in UAE, Iran, Turkey, the UK, Canada and the USA.	The study integrates BIM and UAVs in a model that allows safety managers to obtain and analyse data on construction sites to enable safety specialists to identify hazards at different project phases and develop mitigation strategies.

New ref#	References	Key Words	Themes	Findings
102	Hyari KH., El-Mashaleh MS., Rababeh SM. (2015) Framework for Managing the Traffic Impacts of Building Construction Projects. Journal of Construction in Developing Countries 20 (2): 97-113.	Building construction, Project planning, Construction site, Impact mitigation, Traffic impact.	Review of available construction management plans for 20 large building projects worldwide. Site visits to 7 large building construction projects in urban areas. Multidisciplinary focus group discussions.	The paper proposes a framework for mitigating the traffic impacts of building construction projects in urban areas. The framework can help construction planners and site managers to “better plan and manage construction activities to minimise the impact on the surrounding roads and minimise unnecessary delays by organising timely movement of resources to and from the construction site.”

New ref#	References	Key Words	Themes	Findings
103	Yeo D., Charles P., Hooper S. (Sept 2022). National Harmonisation of Temporary Traffic Management Practice: Benefit–cost Analysis. Research Report AP-R678-22. Austroads Ltd. ISBN 978-1-922700-54-4	Worksite crash risk, crash cost, temporary traffic management (TTM), accreditation, prequalification, registration, traffic management designer, traffic management implementer, traffic controller	Economic evaluation of Autroad's proposal for national harmonisation of TTM practice. Breakeven analysis, analysis of crash data	This report evaluates the Austroads proposal using a breakeven analysis (rather than cost-benefit analysis) that estimates the rate of crash reduction that would be required to cover the proposal's public sector and industry costs. The study estimated that nationally there are 18 fatal crashes, 245 serious injury crashes and 530 minor injury crashes at roadside worksites annually.

New ref#	References	Key Words	Themes	Findings
104	Hamzeh FR. (2011) The Lean Journey: Implementing The Last Planner® System In Construction. Proceedings IGLC-19, July 2011, 379-390. Lima, Perú	Lean Construction, The Last Planner® System, Production Planning and Control, Implementation, and Change Management.	Action-based research, implementation of The Last Planner System®, framework for implementation of the system	Last Planner® system (LPS) is a production planning and control system which has been implemented on construction projects to increase reliability of planning and production performance and improve workflow in design and construction operations. It covers: Master Scheduling, Phase scheduling, Lookahead planning and Weekly work planning. The paper reports LPS implementation challenges and failures from 3 construction projects and suggests a framework for implementing the LPS in construction. It advocates collaborative planning and provides a table of factors for enabling a successful implementation of LPS.

New ref#	References	Key Words	Themes	Findings
105	Daniel EI., Pasquire C., Dickens G., Ballard HG. (2017) The relationship between the last planner® system and collaborative planning practice in UK construction. Engineering, Construction and Architectural Management Vol. 24(3): pp. 407-425.	UK, Construction planning, Collaborative planning, Construction sector, Last planner system, Production planning and management	Interviews. Observation of 15 projects document analysis. The study examined top construction companies in the UK.	The paper examined and reported on the application of LPS (last planner system) of production planning and control / CP (collaborative planning) for construction project delivery practice in construction across the major construction sectors in the UK. The study found that in the UK the current practice of CP partially aligns with the LPS principles. Practitioners that have heard of LPS believe it is the same practice as CP. The evidence of a continuing subtle resistance to meaningful collaboration across the project supply chain is illustrated by inadequate sharing of information and benefit.

New ref#	References	Key Words	Themes	Findings
106	Said H., El-Rayes K. (2011) Optimizing Material Procurement and Storage on Construction Sites. Journal of Construction Engineering and Management; 137:421-431.	Materials procurement; Inventory control; Dynamic layout planning; Optimization; Genetic algorithms.	The tradeoffs a construction project manager has to make between ordering materials and storing materials.	The paper presents the development of a new optimization model for construction logistics planning that is capable of simultaneously integrating and optimizing the critical planning decisions of material procurement and material storage on construction sites. The model incorporates newly developed algorithms to estimate the impact of potential material shortages on-site because of late delivery on project delays and stock-out costs. The model does not take into account impacts outside of the construction site such as vulnerable road users and traffic congestion.

New ref#	References	Key Words	Themes	Findings
107	Ebrahimy Y., AbouRizk SM., Fernando S., Mohamed Y. Simphony Supply Chain Simulator: a simulation toolkit to model the supply chain of construction projects. Simulation: Transactions of the Society for Modeling and Simulation International; 87(8): 657-667.	Productivity analysis, project management, simulation models, supply chain management, systems management, tunnel construction.	Construction simulation software and decision support. Canadian tunneling case study.	This paper presents a construction supply chain simulation toolkit that is capable of modeling different supply chain problems and is compatible with other construction simulation tools. A detailed simulation model of the effects of supply chain issues on the productivity of a real-life construction project, constructed using this toolkit, is also presented.

New ref#	References	Key Words	Themes	Findings
108	Seppänen, O., Ballard G., Personen S. (2010) The Combination of Last Planner System and Location-Based Management System. Lean Construction Journal: pp 43-54 www.leanconstructionjournal.org	Last Planner System (LPS), Location-based management system (LBMS), production control, look-ahead planning, phase schedules, lean construction	Skanska Finland's experience with LBMS and LPS combined with workshops at a hospital project in San Francisco, interviews with three contractors with experience in MBMS and LPS to identify factors specific to industry where activity based scheduling systems dominate.	Both LPS and LBMS aim to achieve the lean goals of reducing waste, increasing productivity and decreasing variability. The paper proposes processes to integrate LPS and LBMS in pre-master scheduling, pull phase scheduling, look ahead scheduling, and weekly planning.

New ref#	References	Key Words	Themes	Findings
109	Hind K. (2020) Appendix F - Sydney metro Construction Traffic Management Framework (CTMF). Sydney Metro West and Greater West construction. Version 1. Sydney Metro.	Traffic management objectives, Implementation framework, Consultation groups, Communication, Approvals, Management of construction traffic, Construction site traffic management requirements, Management of construction sites, Road safety audits	CTMF outlines the approach to managing traffic impacts and contractor requirements with regard to third party agreements, during the Sydney Metro projects	These documents need to be prepared by the Principal contractors responsible for each work package for Sydney Metro construction works to “align with the contents, principles and objectives of the CTMF, as well as contractual requirements, Revised Environmental Mitigation Measures (REMM) and all other obligations of the relevant planning approval. Traffic management objectives are listed and take into consideration VRUs, private and service vehicles, and businesses and residents.

New ref#	References	Key Words	Themes	Findings
110	Construction Logistics and Community Safety (CLOCS) Standard Version 4 (Aug 2022) Ensuring the safest, leanest and greenest construction vehicle journeys. www.clocs.org.uk	Construction logistics community safety, CLOCS, standard	Ensuring safest, leanest, greenest construction vehicle journeys	Primary goals: zero collisions between construction vehicles and the community, improved air quality and reduced emissions, increased efficiency, fewer vehicle journeys, reduced reputational risk. (Direct transcript from Standard).

New ref#	References	Key Words	Themes	Findings
111	Lamonte J. (2020) Adapting the CLOCS approach to Sydney Metro. Sydney Metro NSW Government.	Construction freight	Construction logistics challenges in Sydney, understanding risk profile, safety, delivery partners, best practice, safe vehicles, safe drivers, community safety and awareness, safety in planning and design, monitoring and assurance, adapting CLOCS.	The document outlines the Sydney Metro construction task and challenges including the responsibilities which extend into the community. The document mentions approx. 51% of fatalities in heavy truck crashes in Sydney were VRU. 'Safe System' approach is applied to road safety. Document notes CLOCS recognised as best practice approach internationally to managing road safety in construction through planning and procurement. They are adapting CLOCS in Australia.

New ref#	References	Key Words	Themes	Findings
112	Nguyen T. (Sept 2021) Guide to Temporary Traffic Management Part 1 Introduction. Edition 1.1. Austroads Ltd ISBN 978-1-922382-91-7	Temporary traffic management (TTM), worksite traffic control, risk assessment, road safety	Scope, structure. Definitions and purpose of TTM. Philosophy and principles, governance.	This Introduction is one part of 10 which make up the Guide to Temporary Traffic Management (AGTTM) developed to provide a best practice reference for the “development of safe, cost effective and efficient TTM solutions for Australia and New Zealand”.

New ref#	References	Key Words	Themes	Findings
113	VicRoads (2022). Construction Trucks and Community Safety-Route selection. Human Impact Route Assessment (HIRA) Instructions V1.0. 06/12/2018.	Intent, process, HIRA components, route elements, route scoring, results and next steps	HIRA process flowchart. Workshops, on-street risks, off-street predictors of increased activity.	HIRA instructions. The document details the process of collaborative decision making between local and state government authorities regarding identification and selection of truck routes during major project construction. The HIRA supports strengthening stakeholder relationships: local government, main road authorities, the client and contractor.

New ref#	References	Key Words	Themes	Findings
114	Department of Transport. (2020) Background Paper 1. Traffic Management Plan (TMP) Requirements and Approval Process. Department of Transport, State of Victoria.	Identification and evaluation of risks, treatment, control and mitigation of risks, development of a tailored TMP, Road safety (traffic management) regulation 2019 [Part 4]	This paper is part of a series of background papers related to safety and provision for pedestrians and cyclists at roadworks.	The document identifies traffic management requirements as they relate to various regulations in Victoria. The document considers VRUs.

New ref#	References	Key Words	Themes	Findings
115	Bennett M., Colussi L., Thompson J. (2018) Human Impact Route Assessment – Identifying Risks to Vulnerable Road Users along Construction Vehicle Truck Routes. AITPM Conference paper, available on VicRoads website (2022): Construction Trucks and Community Safety-Route selection.	Development of HIRA, the Decision-making tool, pilot study, future development	The HIRA tool is discussed in the context of CLOCS UK.	Discusses HIRA tool and its inception and the focus on vulnerable road users.

New ref#	References	Key Words	Themes	Findings
116	Koutsokosta, A., Katsavounis, S. (2020). A Dynamic Multi-Period, Mixed-Integer Linear Programming Model for Cost Minimization of a Three-Echelon, Multi-Site and Multi-Product Construction Supply Chain. Logistics, 4(3), 19. https://doi.org/10.3390/logistics4030019	construction supply chain management; cost optimization; mathematical modeling; mixed-integer linear programming model; spreadsheet modeling	Quantifying the benefits of construction supply chain management; Literature review.	This paper proposes an innovative model that merges temporal and project-based supply chains into a sustainable network with repetitive flows, large scope contracts, strategic alliances and economies of scale. The model allows a dynamic tracking of projects and a financial evaluation of each period's decisions (cash flows).

New ref#	References	Key Words	Themes	Findings
117	Zacharopoulos D., El Rharbi B. (2020) Implementing Inland Waterway Transportation as a mode for Construction Logistics in Gothenburg. Master's thesis. The School of Business, Economics and Law, The University of Gothenburg, Sweden.	Inland waterway transportation, sustainable transportation, modal shift, construction logistics, urban transport	Master's project Logistics and Management, semi-structured interviews with local stakeholders, review of relevant literature	The study analyses the successful implementation of inland waterway transportation in Gothenburg, Sweden, as a mode for construction logistics. To gather information, semi-structured interviews with local stakeholders were conducted and analysed in comparison with concepts identified through the review of relevant literature. Economic factors, operational ones, current regulations and behavioural change were found to represent the most challenging barriers to deal with.

New ref#	References	Key Words	Themes	Findings
118	Berroir, F., Guernaccini, P., Boje, C., and Maatar, O. (2021). Reducing construction logistics costs and embodied carbon with CCC and kitting: A case study. Proc. 29th Annual Conference of the International Group for Lean Construction (IGLC29), Alarcon, L.F. and González, V.A. (eds.), Lima, Peru, pp. 935–944, doi.org/10.24928/2021/0120, online at iglc.net.	Supply chain management (SCM), sustainability, action research, CCC, kitting	Data collection. Implementing Just-in-Time deliveries using kitting and a Construction Consolidation Centre managed by a Third-Party Logistics operator on a real-life construction project Both environmental and cost impacts were considered in order to raise the sector's awareness and foster change towards more sustainable practices.	Findings indicate that this new logistics paradigm can lead to productivity improvements and overall reduction in transportation needs. These have an implicit positive impact on both the environment and cost savings, which are calculated and discussed. Based on these results, it is argued that the adoption of this model contributes to a lean-green deal by demonstrating the positive impact of Lean Construction techniques towards better supply chain integration.

New ref#	References	Key Words	Themes	Findings
119	Green R., Khoury I., Wilke P., Gopallawa P. (2017) Best Practices of Road User Maintenance Agreements Amongst Local Government Agencies in Ohio. Final Report. Ohio Research Institute for Transportation and the Environment (ORITE) Ohio University.	Road User Maintenance Agreements (RUMA), energy development, oil and gas development, local road maintenance	Literature search, survey of counties and townships in Ohio, interviews of select county engineers and township trustees.	Matrix of best practices Table 19 page 30. Covers design, incentives, signage, detailed RUMA, admin, ROW acquisition, inspection and enforcement. Also includes truck routing, pavement damage assessment and reimbursement.

New ref#	References	Key Words	Themes	Findings
120	Major Transport Infrastructure Authority. (nd) Construction logistics – current interventions. Case Study: MTP. Victoria State Government.	Metro Tunnel Project (MTP); legal and government requirements; contractual mechanisms; consultation, forums, education and awareness	VRU risk management around projects, processes that inform VRU approach on a project, VRU regulatory landscape, MTIA contractor engagement model.	Revised contractor engagement model; 9 stage model; hazard assessment, contractual terms, procurement schedules and delivery partner selection, review delivery partner documentation, verification of deliver partner performance, incidents and investigation, interface coordination, lessons and knowledge sharing, project close. 6 page ppt.

New ref#	References	Key Words	Themes	Findings
121	Major Projects Vulnerable Road User Alignment Group (2018) Heavy Vehicle Safety Equipment Specifications, Vulnerable Road User Safety, 7 pages.	Vulnerable Road Users (VRU) contract conditions, safe vehicles, safe people training, regular heavy vehicle compliance.	Safety specifications for Heavy Goods Vehicles by class of vehicle.	19 X 7 matrix of truck types and number of safety items required per vehicle. Truck types 19 and Safety items 7.
122	Bengtsson S. H. (2019) Coordinated construction logistics: an innovation perspective, Construction Management and Economics, Vol 37, No 5, pp294-307.	Coordinated logistics; innovation, interorganizational coordination, supply-chain management	Three different models for construction logistics – company-based models, project based models and system based models can be viewed as different levels of innovation.	The objectives for construction logistics might not only be to increase productivity but facilitate collaboration, learning and innovation between interorganizational actors and lower environmental impact. Commitment, communication, cooperation ands strong management are required to implement the 3 different models.

New ref#	References	Key Words	Themes	Findings
123	Department of Transport, Victoria (nd) Victorian Road Safety Strategy 2021 – 2030.-	Road safety, traffic deaths, reduction strategies, Vicroads	Progressive reduction in fatalities in next 10 years, initiatives with immediate impact	Embed safe systems approach with road safety partners in Victoria, develop levers to address road safety, welcome technological advances. Support and enforces safer driving behavior, strategic focus on vulnerable and unprotected road users, increase safety for those using the road for work. Aim for zero road deaths by 2050.
124	Austroads (2020) Guide to Traffic Management Part 13, Safe Systems Approach to Traffic Management	Road environment safety, road safety, Safe System, human factors, traffic management, driver behaviour, road safety engineering, road alignment, cross-section, pavement, roadside, intersections, crossings, traffic controls, signals, signs, delineation, lighting, roadworks.	Traffic management under safe systems philosophy	Part 13 defines a safe road environment and the broad approaches for achieving it. It outlines basic human factors as related to users of the road and traffic environment, and how these can be influenced by road design and traffic management practice

New ref#	References	Key Words	Themes	Findings
125	Austroads (2016) Safe Systems Assessment Framework, Research Report AP-R509-16, Austroads Ltd. Sydney NSW.	Safe System, risk assessment, exposure, likelihood, severity, infrastructure, treatment hierarchy	proposes an assessment framework designed to help road agencies methodically consider Safe System objectives in road infrastructure projects.	The framework considers key crash types that lead to fatal and serious crash outcomes, as well as the risks associated with these crashes (exposure, likelihood and severity). It provides prompts to ensure each pillar of the Safe System are considered. A treatment hierarchy is also provided to help identify the most effective treatments that might be used to minimise death and serious injury.
126	Austroads (2016) Safe Systems in the Planning Process, Research Report AP-R488-15, Austroads Ltd. Sydney NSW.	Safe System, land-use planning, urban planning, integrated transport planning	Good planning and design sets the foundation for a safe road environment. This report aims to promote consideration of Safe System principles in planning decisions	This report includes material that can be used to form the basis of a brochure or article that could be produced to introduce planners to the Safe System. In addition, a checklist resource is provided which may be adapted and incorporated into planning guidance to prompt planners to consider road safety issues (including Safe System principles) during the planning process.

New ref#	References	Key Words	Themes	Findings
127	Monash University Accident Research Centre (2004) Development of the Visionary Research Model – Application to the Car/Pedestrian Conflict, Monash University, Clayton, Victoria.	Vision Zero, Visionary Research Model, Pedestrians, Car/pedestrian conflict, Crash risk, Injury risk, Kinetic energy, Countermeasures.	Improve road safety through a fundamentally different approach – draws on Swedish Vision Zero road safety philosophy.	Develop a model known as Visionary Research Model to identify research needs and priorities to create safe traffic environments. Pedestrian is at the centre of 5 concentric layers of protection.
128	Cornelis S., Todts W. (2016) Eliminating truck blind spots – a matter of direct vision; A comparison of best vs worst in class direct truck vision. Transport & Environment	Trucks, safety, direct vision, blind spots, long haul, construction, urban delivery, direct vision standards.	Loughborough University study analysis and simulation of truck blind spots and VRU's.	Construction trucks have 3 blind spots totalling 3.2 metres. Introduce direct vision standards for trucks, low entry cab designs for urban distribution vehicles, Gradual phase in of requirements.

Part B2 INTERVIEWS

Summary of interviews

Major Themes Arising from the Interviews of TG3 Stakeholders and Other Relevant Parties

There were 15 interviews conducted. There were 13 online interviews and 2 face to face interviews.

Table 1 summarises the job roles of the interviewees and their organization. There were a wide variety of job roles covering varying aspects of construction logistics. The organizations interviewed were predominantly from tier 1 construction companies and state governments. Consequently, the questions in the interview were often not relevant to the job role and so were not answered. The questionnaire needed to be adapted during the interview to match the experience and job function of the interviewee. Interviews ranged from 30 minutes to about one hour. Detailed notes were taken during the interview and supplemented the online recording of the interview.

Table 1 Job Role and Organization Type

Job Role	Organization
Safety management	State Govt
Traffic and Transport Engineering	Tier 1 Construction company
Logistics Superintendent	Tier 1 Construction company
Operations Health and Safety	Tier 1 Construction company
Policy advisor	Crane Industry Council
Delivery safety, incident analysis	State Govt
Road User Policy Analyst	State Govt
Project Manager Logistics	Tier 1 Construction company
Safety officer	Local Govt
Field Services - sales	Technology company
Road safety manager	State Govt
Planning and control manager	Tier 1 Construction company
Researcher and Evaluator	Traffic Management
Fleet Operations	Tier 1 Construction company
Project Manager Logistics	Construction Company

Table 2 provides a summary of interview transcripts related to the questions most answered. The interviews provided a rich amount of information on the methods used to manage construction logistics.

Table 2 Summary of interview transcripts

Interview#	Organisation	Job Role	CLOCS Knowledge	Route Planning	Training awareness of VRU	Stakeholder Engagement	Technologies	CLOCS like internal standards / processes	Usefulness of CLOCS Standard	Likelihood would use of CLOCS Standard in route planning and logistics in the future	General Comments
1	MTIA Vic	Safety management	High knowledge - close involvement	N/A	A clause in contract	Stakeholder reference groups	tracking systems for trucks	Yes, required in contracts	Not directly asked by would infer useful	CLOCS-type Standards are already included in their contracts	They are the client. They leverage the contractor to provide social value. Have inclusiveness guarantees in contracts where marginalised and disabled people need to be included in the project.
2	Aurecon	Traffic and Transport Engineering	Yes since 2016	Involved in the HIRA project-aware of importance of route planning considering VRUs	Not involved in training	not asked	Traffic impact assessments and Safe Systems assessment	yes	Very important	Currently limited knowledge within organisation	Work related to traffic management and aware of risks associated with VRUs. Liited knowledge of

Interview#	Organisation	Job Role	CLOCS Knowledge	Route Planning	Training awareness of VRU	Stakeholder Engagement	Technologies	CLOCS like internal standards / processes	Usefulness of CLOCS Standard	Likelihood would use of CLOCS Standard in route planning and logistics in the future	General Comments
											CLOCS in organisation.
3	Gamuda	Logistics Superintendent	No	No, provided by the NHVR for oversize vehicles. Detailed route planning, comprehensive traffic management planning.	Yes	Yes	Software - Datascope materials and transport booking system. Plant Assessor -monitors vehicle compliance.	yes	Already have policies and procedures in place in their organisation.	not asked - but commented that it would be useful for subcontractors.	Smaller companies do not adhere to the same standards as tier 1 companies. Sub-contractors resistant to implement all policies and procedures because of cost.
4	McConnell Dowell	Operations Health and Safety	No	Done by traffic engineers within the company.	Yes	Community relations people door knock, conduct information drops, meetings with business owners.	Not mentioned	They already have CLOCS-like policies and procedures.	yes, as very job has associated VRUs	Yes, it would complement traffic management and put more light on VRUs	Compliance and securing loads is a concern. Noted that training for sub-contractors should be simple, use visual diagrams to deliver the message. Need to be mindful of challenges

Interview#	Organisation	Job Role	CLOCS Knowledge	Route Planning	Training awareness of VRU	Stakeholder Engagement	Technologies	CLOCS like internal standards / processes	Usefulness of CLOCS Standard	Likelihood would use of CLOCS Standard in route planning and logistics in the future	General Comments
											facing Tier 2 and 3 wrt finances.
5	Crane Industry Council	Policy advisor	Loose understanding	Yes-they have to organise approval themselves. Traffic management of cranes is rarely considered in construction logistics and project management. Working with LGA challenging-no guarantee of approvals.	The industry is very conscious of road safety.	The industry is very conscious of road safety.	Not mentioned	N/A	Very useful=10. Road safety needs to be considered in route selection.	High	Poor communication within local government. Can take up to 28 days for approval and not be guaranteed.
6	MTIA Vic	Delivery safety, incident analysis	Yes - 2020	Yes- HIRA	Yes	N/A	N/A	N/A	7/10.	Would require it from delivery partners. Use CLOCS standard in route planning and logistics.	Standards help and allow us to organise things into one piece of thinking.

Interview#	Organisation	Job Role	CLOCS Knowledge	Route Planning	Training awareness of VRU	Stakeholder Engagement	Technologies	CLOCS like internal standards / processes	Usefulness of CLOCS Standard	Likelihood would use of CLOCS Standard in route planning and logistics in the future	General Comments
7	DOT Vic	Road User Policy Analyst	Yes - on TG4 working group	Involved with HIRA	HIRA considers this	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	VicRoads has material on their website related to construction trucks and community safety. Have had budget constraints to do outreach to construction industry about HIRA.
8	Laing O'Rourke	Project Manager Logistics	Yes 2020 but not in UK where he worked for 12 years	Yes close collaboration with Councils, traffic coordination group meets every 2 weeks, CJP approve all docs	yes	yes - meetings every 2 weeks	360 degree tree clash detection study moving TBM	yes - comprehensive process with all parties	8/10 but needs to be widely adopted across industry	yes, but we have our own standards	uses HV national route plan all the time to work out routes
9	LGA - QLD	Safety officer	yes - 12 months ago	yes for external contractors but not for inhouse road maintenance	yes	done by other department in Council	telematics	yes but split between departments / projects	10/10 ideally	not responsible for route planning - another group	lack of planning and preparedness - maintenance is reactive. Poor coordination

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											between departments
10	Geospatial Data / Construction Technology	Field Services - sales	yes - deep knowledge of road safety	N/A	yes	N/A	Virtual Risk Manager, telematics, Blaxtair, Santos IBMS, LOSA Line operator Safety Audit	N/A	not for their company - a code of practice might assist smaller operators in compliance	N/A	Use of a contractual agreement with sub-contractors that they must use company telematic system - to get paid. What does it cost a company if there is an accident?
11	Sydney Metro	Road safety manager	Yes - deep involvement	N/A responsible for compliance	yes - high level	yes - through CLOCS committees	Construction Traffic Management Framework CTMP / HIRA	yes	Govt uses CLOCS like standards in 21 projects now	highly likely	CLOCS TG3 should make assessment of higher productivity vehicles HPV's part of standard.

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12	Laing O'Rourke	Planning and control manager	none	yes - there is a route planning team reporting to the manager	yes, detailed traffic management operations for VRU	N/A	Primavera P6, Microsoft project, operator owned resource allocation software	yes	not really - inhouse standards and processes	low	Planning and coordination are central to task but unions and demarcation lines cause expensive delays. Industrial relations are significant.
13	Safe Systems Solutions	Researcher and Evaluator	yes	indirectly with local government	company provides this as a service to clients	supports client - fleet operators	safe systems audits	N/A	not discussed - would like safe systems approach in CLOCS A	not discussed N/A	cyclists not taken into account by trucks and route planning. Do not recognise impact on cyclists.
14	Acciona	Fleet Operations	2021	yes	yes	work with local community before work starts -	Building information management BIM	yes	if it provides consistency	8.5/10 put CLOCS standards into contract for tender	most work done by truck and dog - most subcontracted out - hard to manage gravel and rock falling on road -

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											hitting other cars
15	Systems Connect	Project Manager Logistics	yes - 6 months ago	yes - traffic management group reports to logistics manager	yes		J D Edwards . Veyor, Excel	yes	key is standard across the board- get trucks to comply	8/10	importance of material planning linked to traffic management

Awareness of Vulnerable Road Users (VRUs) and CLOCS.

All the 15 interviewees had a strong awareness of safety issues and VRU's. Some were aware of CLOCS, but some were not – most had CLOCS like processes in place to manage road traffic into and out of construction sites. In some cases, Tier 1 interviewees were hesitant to recommend CLOCS in their organisations because they already had similar programs and operating procedures in place, but they thought it would be valuable for their subcontractors and provide a standardised approach to managing VRU's and construction vehicles. Government clients embedded CLOCS like standards into their tender documents.

Construction Logistics Plans.

The interviewees did not use the phrase "Construction Logistics Plans" but it was clear from the interviews with project managers, fleet operation managers, planning and control managers and logistics managers that they did do extensive logistics planning but this was spread over different people in their departments. It is likely that there was no single document labelled "Construction Logistics Plan". In contrast there were detailed documents for traffic management plans that were central to their VRU management.

Cyclists and Traffic Management Plans.

One of the interviewees specialised in evaluating traffic management plans for government agencies. Their perception was that although traffic management strategies included pedestrians and cyclists their specific needs were secondary to the requirements of the construction site and construction vehicles. For example, traffic management plans for cyclists seemed to be unaware of the gradients in the new routes that made it difficult for cyclists. Steel plates covering holes in a road could be dangerous for cyclists and motorbikes when it rained.

Logistics Planning Systems.

Tier 1 operators used a variety of enterprise management software (for example Primavera and JD Edwards). Planners also used Microsoft Project and Excel spreadsheets for vehicle scheduling. However, their seemed to be a disconnect between the material procurement process and the truck movements planning – due to different software systems. Tier 1 operators used telematics to locate sub-contractor vehicles in time and space. This occurred because sub-contractors had to log onto the system to issue an invoice and get paid.

Stakeholder Engagement

The project managers interviewed were all engaged on major government projects in Geelong, Melbourne, and Sydney. These projects had significant community engagement prior to the commencement of construction and during construction. The interviewees themselves were not involved directly in stakeholder communication. This role was performed by other departments within their organisations.

PART B 3 **Truck Driver Hazard Vigilance in a VRU Environment**

Construction trucks are similar in many ways to other road freight vehicles, however, because they often undertake a very large number of short haul trips in urban areas the probability of encountering urban, and especially Vulnerable Road Users is high. As such a construction driver's training should be supplemented with at least an overview, if not formal training, regarding urban hazards and especially those hazards that potentially involve Vulnerable Road Users. The following four training groupings list elements that urban truck drivers, including construction drivers, should have at least induction training in, and be cognoscent of:

Vision Vigilance

- Driver will use mirrors and visuals to determine the proximity of other road users
- Vary your vision by scanning 180 degrees and checking side and rear mirrors
- Driver uses his/her peripheral vision to assess any surrounding hazards
- Minimize your vision block-out that is caused by the left and right cab pillars. Lean forward and stretch to look out over the shoulders for possible VRUs.
- Driver checks when entering a roundabout entry for VRUs trying to overtake or undercut your truck.

Hazard Recognition

- Be more vigilant to the presence of motorcycles, urban cyclists and pedestrians at night
- Recognize the hazard: Physical, or caused by other road users or vehicles, or road surface condition related
- Determine what hazard procedure should be adopted (with at least 12-15 seconds forward planning)

Truck Placement and circumventing the hazard

- Ensure truck is in correct lane or road space travelling at an appropriate speed allowing for evasive action when approaching the hazard. (4 – 7 second approach time to brake)
- Look for alternative hazard avoidance routes as options, mindful of the following distances to other vehicles
- Driver will determine an alternative bypass strategy if circumstance change when approaching or passing the hazard
- Driver will choose an appropriate/priority path for hazard avoidance
- Driver will choose an appropriate speed and gear with which to negotiate the hazard, and the
- Driver will adopt a safe following distance to the other vehicles moving through the hazard .

Courtesy

- Always exhibit stable behaviour and courtesy to other vehicles and road users

Note: Trucks take about twice the distance to stop when braking compared to an SUV. Advancing your braking allows you to not be 100% reactive