

The Magazine for the materials handling professional

EUREKA

No. 29 Autumn 2017

www.eurekapub.eu



YEARS ANNIVERSARY EDITION

IN THIS ISSUE

Then and now

What differences have ten years made to the materials handling world?

Never say die?

Recycled forklift materials turn up in the most unexpected of places

A word from the professors

Shaping logistics students to meet the industry's future demands

COMMISSIONING EDITOR

Monica Escutia

ASSOCIATE EDITOR

Virpi Tynkkynen

CONTRIBUTING EDITORS

Mark Nicholson

Gian Schiava

Ruari McCallion

Gay Sutton

ART DIRECTOR

Dave Hobbs

PRODUCED BY

gu9creative

PRINTED & DISTRIBUTED BY

BTB Mailflight, UK

PUBLISHED BY

Cat® Lift Trucks, Hefbrugweg 77,
1332 AM Almere, The Netherlands

CHECK OUT

www.eurekapub.eu



Here you will have access to other articles and useful information.

FOLLOW US



©2017, MCFE. All rights reserved. CAT, CATERPILLAR, BUILT FOR IT, their respective logos, 'Caterpillar yellow' and the 'Power Edge' trade dress, as well as corporate and product identity used herein, are trademarks of Caterpillar and may not be used without permission. All material is strictly copyright and all rights are reserved. No part of this publication may be reproduced in whole or part without the prior written permission of the copyright holder. Opinions expressed in Eureka are not necessarily those of Cat Lift Trucks (MCFE B.V.) or its dealers. Cat Lift Trucks (MCFE B.V.) does not accept responsibility for the opinions or information expressed in the articles or advertisements.

OEPC1607(10/17)gu9

IN THIS EDITION

Our special anniversary issue celebrates ten years of publishing Eureka. To mark this milestone, we are looking at the past, present and future of the materials handling industry. Our aim is to help readers learn from history, understand today's issues and be prepared for the changes we predict.

Setting the scene for this journey, we have a graphic presentation with snippets of information compiled by **Ruari McCallion** and **Mark Nicholson**. They highlight just a few of the differences between what we were reporting in 2007 and what we see today.

For a strategic opinion on the last decade's key trends, Mark interviews Hans Seijger of Cat® Lift Trucks. Mr Seijger is clear on the big challenges facing this industry but remains positive about our prospects of overcoming them with the right approach.

Continuous evolution of materials handling equipment, warehouse operations and the industry itself has forced drivers and managers to adapt constantly. **Gian Schiava** looks at how life in a warehouse has changed and what the future holds for employees. Later, Gian talks to two professors and finds out how logistics schools and universities are gearing up to produce the logistics managers our changing world will need.

Sustainability is becoming more and more important, both to materials handling profitability and to our continuing quality of life on this planet. **Gay Sutton** tracks down what happens to forklift component materials, from a truck's 'death' to their recycling and reappearance in a variety of new products.

We would like to thank all of our readers for making this 10th anniversary possible. We hope you will continue to find Eureka useful and we would be delighted to receive your feedback. Are there topics you would particularly like us to cover? Do let us know. You can email comment@eurekapub.eu or message us via our website www.eurekapub.eu.



Monica Escutia
Commissioning Editor

Eureka's commissioning editor is Monica Escutia, a Bachelor of Communications – Journalism. She is a Spanish national and fluent also in Dutch, English and Italian. Having previously edited a variety of international media she has spent the last 14 years in the materials handling industry – the first four as a parts sales representative for several European countries, before becoming the EAME Manager Marketing Communications for Cat Lift Trucks, based in the Netherlands.



CONTENTS

04 Then and now

What changes have we seen in materials handling over ten years of publishing Eureka?

06 View from the top

Hans Seijger, Vice President Marketing and Sales for Cat® Lift Trucks in the EAME region, assesses the last decade's key trends.

07 Events

Stay informed and share knowledge with fellow professionals.

08 The changing face of working in a warehouse

How the jobs of forklift drivers and warehouse managers have adapted – and continue to adapt – to evolving forklift trucks, working environments and industry needs.

10 Never say die?

You may be surprised to learn how much of an old forklift truck can be recycled – and where its component materials reappear.

14 A word from the professors

What logistics schools and universities are doing to equip tomorrow's logistics managers for this increasingly complex and demanding professional role.



2007

TECHNOLOGY

The Cat® NR-N reach truck's revolutionary **poweRamic mast** was seen as one of the most significant forklift developments for decades. So far ahead of its time, it remains a key selling point today.

WORKING CONDITIONS

Drivers were lucky even to have a **roof!** Extensive user surveys, as part of the Cat NR-N reach truck design process, reflected the importance of **ergonomics**. **Environmental, health and safety** legislation was making workplaces cleaner and safer – but there was much room for improvement.

AUTOMATION

AGVs (automated guided vehicles) were regarded by many as a future solution. Many warehouse tasks were still performed **manually**.

PERFORMANCE

Warehouses were becoming higher and a typical high-level order picker had a reach of **9 metres**. Forklift truck capabilities continued to increase – and so did **buyers' expectations**.

SAFETY

Forklift trucks frequently fell from **loading docks**. As today, regular reinforcement of **safe behaviour** was essential. **Overbalancing** when turning at speed – often with forks raised – was a common cause of lift truck accidents.

MOTIVE POWER

Around half of Europe's forklift trucks were driven by **electric motors**. **AC** (alternating current) was now available for forklifts and its advantages were much discussed. **Diesel trucks** were often being replaced by LPG for use in enclosed spaces.

2017

TECHNOLOGY

Cat Responsive Drive System – monitoring operator behaviour and constantly adjusting performance parameters to meet changing needs. **Cat advanced intelligent curve control** – calculating and applying the right speed reduction, with no sensation of tilting or sudden change. **Cat S4 mast handling** – and related developments – making all movements fast but smooth, accurate and controlled, with high stability and minimal sway.

WORKING CONDITIONS

The science of **'user experience'** advances further and is key to the Red Dot Design Award-winning Cat EP25-35(C)N 80V electric's success. Tighter legislation and an increasing focus on driver training have **reduced accident and sickness rates**.

PERFORMANCE

Everything a truck had to do ten years ago it now has to do **better**, faster, in tighter spaces, for longer and at lower cost. The Cat NOH10NH with triplex mast enables picking heights up to **11.5 metres** and has **Active Sway Control** along with a range of other features for improved safety and productivity.

AUTOMATION

AGVs offer at least equivalent productivity to human-operated equipment and over longer periods (they don't stop for lunch) – with pallet transport, forklift, straddle and counterbalance versions all now available. Automation is commonplace in the modern warehouse and lifting, picking and packing, palletising and wrapping are increasingly likely to be **handled by machine**. The next step is **autonomous vehicles**, which will be able to guide themselves around suitably equipped warehouses.

SAFETY

Premises can be made safer with aids like **automated loading bay door locking** and **vehicle restraint systems**. **Automatic safety functions** – as on the Cat NR-N2 reach truck – make it more difficult for drivers to overturn trucks or shed loads through excessively fast or jerky travel and mast movement. **Electric lift trucks** have increased their share of the market. **Emissions** from diesel trucks are becoming cleaner, with stricter legal limits, but they are now effectively banned from indoor use – while LPG progress is hindered by higher running costs.

MOTIVE POWER

Trucks like the Cat EP40-50(C) (S)2 80V electric counterbalance typically offer **fully enclosed cabin** options.



A decade of change in materials handling

What issues were Eureka covering in 2007 – and how different is today's forklift world?

THEN & NOW

VIEW FROM THE TOP

FORKLIFT MANUFACTURER'S VICE PRESIDENT REFLECTS ON TEN YEARS OF CHANGE

For a strategic view on materials handling, Eureka's **Mark Nicholson** has spoken to Hans Seijger, Vice President Marketing and Sales for Cat® Lift Trucks in the EAME region. What does he see as the most interesting and important trends over the last ten years?

AUTOMATION

Mr Seijger views technology as a big driver of change, noting that automation and integration are at the forefront of this industry's advancement. The aim is to create a complete materials handling process in which every piece of equipment works together in the most efficient way possible. Data capture and exchange are keys to improvement, hence the fast development of aids such as barcodes, scanners and RFID tags.

"Labour costs and workforce sizes are falling as the need for driver-operated machines declines," he says. "I believe there is still a lot more scope for AGVs (automated guided vehicles) and other automation in warehouses, and we will see the trend continue."

"Both manufacturers and customers are investing strategically in automated systems. As demand increases, economy of scale will make them more affordable. With a well-established and cutting-edge AGV design and manufacturing facility within our family, we at Cat Lift Trucks are well placed to go with that change."



Cat® continues to excel in product development.

RECESSION AND RECOVERY

Ten years ago we saw the start of the latest recession. We are now well into the recovery phase, but things have changed. Today we have to deal with a very different world, which Mr Seijger feels has been largely shaped by the recession and its aftermath.

"Electric forklifts are taking over from IC engine, while warehouse trucks are replacing counterbalance. Green issues and safety regulations have become more of a consideration. And today's warehouse industry has a greatly altered footprint."

"I'm happy that the market is currently so buoyant and positive, and that people are much more willing to invest. If managers are feeling stressed, it's often over how to realise their projects faster and within budget. In addition, rapid business growth is causing strain throughout supply chains, with availability of products becoming an issue."

IT'S NOT JUST ABOUT PURCHASE PRICE

Making better profits is a goal of every business, but there is now much more to this than seeking lower-priced forklift trucks. Mr Seijger comments that after a period of intensifying pressure on purchase price the focus has changed direction.

"Customers are focusing more on forklift rental and looking for great all-in deals covering service, parts and even energy. They still want further savings, so we must develop solutions that do everything more efficiently. Improving distribution is a top priority, with a growing trend toward direct distribution, but we must work to upgrade the quality and value of all our services. We and our customers need to increase our investment in advanced technology and equipment to make this possible."

Speaking of technological change, the potential of digital business platforms has been taken to a whole new level by some new players. Forklift truck rental is booming and the question of who will own trucks in the future has become an interesting one.

"Think of companies like Airbnb and Uber, and other pioneers of the 'sharing economy'. In this revolutionary economic model, new entrants to a market can achieve huge success by giving customers access to other people's assets. We all need to be aware of this trend and its potential impact on our businesses."

GLOBALISATION AND CONSOLIDATION

Cat Lift Trucks' Vice President observes that globalisation is having a major impact on the operations of forklift truck manufacturers and their customers. One response from its 'mother company' has been to make strategic acquisitions, strengthening its ability to meet customer needs. Cat Lift Trucks is also extending into various markets and segments where its presence was previously small. Many of its customers are consolidating their

businesses too, and trading across borders. "To meet the needs of these growing companies, we need to develop processes and procedures that work across borders. They are attracted toward manufacturers and dealers who can take care of everything, so they can cross borders without complication and extra effort. "Another outcome of our customers' consolidations is that local dealers may lose direct access to them. To maintain the dealers' market share, the manufacturer must fill the gap by bringing business to them from national and multinational companies."

A STRONG FOUNDATION

In 2017, the Cat Lift Trucks operation for Europe, Africa and the Middle East celebrates 25 years of serving customers from its base in Almere, The Netherlands. Mr Seijger has been impressed by the quality of its long-term relationships with dealers and by its handling of change.

"Global economic pressures required a substantial reshaping of the organisation's manufacturing footprint in 2012, but the change was managed well and we have come out stronger. The dealers' confidence in our relationship and its continuity, as shown by their very significant and continuing investment, is an extremely valuable asset. We have a very strong foundation. I should add that our prime responsibility is still the development of great new products that excite customer interest, and in that area we also continue to excel."

LOVING THE CHALLENGE

When asked what worries him about modern materials handling, Mr Seijger says he sees no problems – only interesting challenges. "I enjoy this dynamic environment and its challenges. I'm excited by the rapid technological development and its impact on distribution models, product development and organisational efficiency. It's all fascinating to me."

"I especially like the fact that the pace of change is accelerating. That suits my personality. You need to be quick in deciding which trends to follow and determining your position – and very soon you have to review it because the world has changed again. I think that's great." ●



www.catliftruck.com



HANS SEIJGER

Before joining Cat® Lift Trucks in 2014, Hans Seijger held senior management positions at a variety of heavy manufacturing companies over the course of 24 years. His experience spans commercial vehicles, forklift trucks, offshore transport and packaging-related printing equipment. He has worked in Germany and the UK as well as his Dutch homeland, where he studied Industrial Business Administration at the Polytechnic University Enschede.

He thrives on the materials handling world's rapid pace of change, but outside work he seeks a quieter life. Home is a private retreat "in a forest" about 50 km from his office. He loves nature and enjoys yardwork, such as wood chopping and cutting back trees to keep his drive clear. His interests include classic cars, like the 1964 MGB roadster he brought over from England. He is married and his three children are at university.

"You need to be quick in deciding which trends to follow and determining your position."

Article feedback is welcome: editor@eurekapub.eu

EVENTS



SUPPLY CHAIN EVENT 2017

7 - 8 November 2017
Porte De Versailles, Paris, France

Supply Chain Event is the cutting-edge trade event of the year, presenting new solutions and technologies to optimise operations for an audience of 3,000 supply chain managers and project officers.

With benchmark business case presentations and opportunities to network with experts, software publishers and hardware suppliers, Supply Chain Event – a trade show, conference programme, and business forum rolled into one – is a chance to drive digital transformation projects forward.

www.supplychain-event.com

SUPPLY CHAIN SUMMIT 2017

9 November 2017
Hilton Bankside, London

In an industry of constant and complex change, the IGD Supply Chain Summit is the pivotal event for professionals striving to improve their companies' supply chains.

This November, retailers and suppliers will showcase their successes and reflect on what can be improved. There will also be interactive sessions focusing on your strategies for stronger supply chains.

www.igd.com/events/conferences-and-trade-briefings/supply-chain-summit-2017

INTRALOGISTICS EUROPE

20 - 23 March 2018
Paris Nord Villepinte, Paris, France

Intralogistics Europe brings together all handling equipment and automated systems which process and rationalise the physical movements of supply, production and distribution.

Whether it is optimising processes and costs, security or sustainable development, all the latest innovations can be found at Intralogistics Europe. An innovative event with business-led content, Intralogistics Europe is totally focused on the needs of professionals in manufacturing and distribution.

www.intralogistics-europe.com

The changing face of working in a warehouse

ADAPTING TO MATERIALS HANDLING EVOLUTION

The forklift truck is practically a century old and during that time we have seen many new varieties. Today its value is still undeniable in the warehouse, loading dock or yard. For this special issue of Eureka, **Gian Schiava** sets out to discover how the development of forklifts and their natural habitats, especially the warehouse, have impacted on the humans that work with them.

Back in the early 20th century, the forklift was a kind of push truck and it was not until the pallet was invented that it started to become a common tool in all kinds of businesses. Today forklifts play an essential role in modern materials handling. It's clear that moving goods efficiently has also become crucial to the bottom line. Let's find out how the logistics manager and the forklift driver have had to adapt.

DRIVING A FORKLIFT IS NOT AN EASY JOB

After the first rough forklift entered the market, it didn't take long before different varieties started to emerge. The thirties saw perhaps the first contemporary-looking forklift with an internal combustion engine and a hydraulic lift and tilt system. During the Second World War, the Americans used the truck as an important means of transport, understanding that proper logistics created a crucial advantage in the battlefield.

Later we saw the development of all kinds of forklift types, such as stackers, reach trucks, multi-way forklifts, narrow aisle trucks, order pickers and container handlers. As the range of machines grew, specialist companies developed so-called 'forklift attachments' for specific jobs, like clamps, grippers and fork spreaders.

Toward the end of the last century the warehouse was no longer just a place to keep goods but an important link in the whole supply chain, and for business it became essential to deliver products

fast. The rise of e-commerce accelerated things even further and the forklift was again enriched with new devices such as scanners and weighing devices.

The now mostly electric trucks in the warehouse are driven by trained staff who not only operate the truck but constantly connect with IT systems for updating and exchange of data. There is no longer just one kind of driver: the most skilled workers operate the more complex machines, like man-up trucks or high-level order pickers, making sure that desired output levels are achieved.

Other warehouse employees ensure orders are collected by automated guided vehicles (AGVs) or other mechanised solutions, resulting in the elimination of long walking distances in the warehouse.

The warehouse worker now checks machines, interacts with the ERP (enterprise resource planning) system and controls single-handedly an operation that used to involve dozens of people. Warehouse operators or forklift drivers need continuous training to keep up with technological changes and new working methods. In addition, they have a growing number of regulations to meet in order to secure proper levels of health and safety control.

The first virtual reality devices, such as VR glasses, are already being used in the warehouse, bringing forklift drivers all the information they need, right in front of their eyes. Voice technology actually 'talks' with the driver, helping him or her to collect the goods swiftly and without error.

Put simply, the job has become much more complex.

WAREHOUSE FOREMAN BECOMES MANAGER

Today's forklift driver has to deal with a myriad of technological aids to perform tasks, and the same goes for the warehouse or logistics manager. Of all activities in the warehouse, the order picking and dispatch tasks have become the most important.

But in the loading and unloading area, production logistics or any other field where materials handling is involved, the manager must also drive activities efficiently and cost-effectively and meet Key Performance Indicators. It's not like in the old days, when it was enough to know where the goods were kept!

Today, the warehouse manager needs to reckon with new technologies like 'big data', the Internet of Things and robots to make sure his department contributes to the bottom line. In fact, the warehouse is just one link within the whole supply chain and is managed accordingly.

A logistics manager needs a highly specialised education, often at university degree level, to find opportunities in larger, cross-functional, multi-country operations. He or she needs to understand issues around transportation, customs and packaging, and at the same time know what the market wants. Indeed, it is not uncommon for logistics managers to meet up with marketing people to anticipate peaks, promotions or new channels.

No longer is it just about cost reduction. It is probably not even just about performance. Materials

handling has become key to a company's success and even contributes to achieving broader goals, like sustainability. A simple example is when companies opt for the most fuel/energy-efficient forklifts to reduce their carbon footprint.

THE DILEMMA OF MECHANISATION AND AUTOMATION

It is not easy to predict how the current trend for increased mechanisation and deployment of robots in the warehouse will affect the forklift driver or warehouse employee in the coming decades.

Pessimists warn of a disastrous loss of jobs, leaving warehouses operated mostly by machines with hardly any human involvement. Others feel we are only seeing what has always happened: that jobs in the warehouse or any other materials handling activity are constantly evolving; and whilst some jobs may disappear, other new jobs will emerge from this evolution.

Recruitment agency Hays foresees the rise of jobs like logistics planners, data analysts, sustainability experts and flow management specialists. When Hays researched the 'Job of the Future' in logistics, amongst 350 professionals, most of them actually predicted a large increase in jobs, at least until 2025, to cope with the ever-increasing role of logistics.

Whatever the outcome may be, without doubt the forklift driver and warehouse manager of tomorrow will once more require other, new skills and enhanced educational programmes. ●

Put simply, the job has become much more complex.

Article feedback is welcome: editor@eurekapub.eu



NEVER SAY DIE?

CLOSING THE LIFT TRUCK MATERIAL LOOP

In this anniversary issue, **Gay Sutton** looks behind the scenes to see what happens to that trusted old warhorse – the forklift truck – when it's scrapped, and how elements are resurfacing in many unexpected places.

Growing demand for resources – materials and power – is spurring countries around the globe to migrate to a new ethos: that of the circular economy, where the two ends of the old linear take-make-consume-and-dispose lifecycle are brought together to form a self-sufficient loop by recycling. In the EU, this has been enshrined in the European Commission's 2050 vision and summarised as 'living well within the limits of the planet'.

So, with a raft of EU environmental and recycling legislation in place, what happens to your old forklift truck when it reaches the end of its life?

THE HEROES OF THE MOMENT

The forklift dealers are the heroes of the first phase of scrapping and recycling. "The forklift truck dealers are very resourceful and recycle as much as possible themselves," explained Duncan Nealon, Chairman of the Fork Lift Truck Association. A truck that is returned to the dealer for scrap will be broken down bit by bit for spares. Anything that can be reused and recycled, such as gearboxes or drive motors, will be kept, repaired or remanufactured, and then put back into use. Dealers are the masters of recycling viable components.

EU regulations are then very strict for certain streams of waste, each of which is sent to a specialist company to be dealt with. So

engine oil and hydraulic oil are drained from the carcass by the dealers and sent for disposal, while batteries and catalytic converters, containing a number of hazardous components, are also sent to companies with the capability to recycle and dispose of them.

What is left is essentially the scrap metal – the chassis and the counterweight with the odd extra such as wiring, seat material and straps – and this then goes to a scrap metal dealer.

That's the last a forklift user or dealer will see of it. Or is it? Let's now look a bit deeper below the surface and see what happens next.

SCRAP METAL

Scrap metal enters what can be described as a pyramid industry with small companies at the bottom and large multinationals at the top. Explained simply, the scrap metal starts its progress at a shredding plant where materials are sorted then broken and shredded.

The next step uses huge magnets to extract the iron and steel from non-ferrous metals such as copper and aluminium, as well as what Howard Bluck, Technical Director at the British Metals Recycling Association, describes as 'shredder fluff'. Further separation can be achieved manually, or by using electrical currents, high pressure air flow and liquid floating systems. Iron, steel and non-ferrous metals are then compacted into bales and sent for ▶▶



An old forklift is destined for the scrapyard – but its materials will live on.

"The forklift truck dealers are very resourceful and recycle as much as possible themselves."

processing into new raw materials. Other items such as cloth and paper are baled for use elsewhere.

Although theoretically most metals can be continually recycled, there is always the risk that small amounts of other materials such as copper wiring are still attached to the metal when it is magnetically separated. This leads to so-called 'tramp elements' entering the steel melt, and these can ultimately change the characteristics of the final steel output.

"And once you get a particular percentage of copper in steel you start to get fissures and fractures at the microscopic level around the grain boundaries of the copper embedded in the steel," Howard said. Ultimately, there will be a point at which the steel can no longer be used for high-quality products, and one of the next major steps in improving the recycling process, he believes, will be discussing how to tackle this quality issue.



In theory, most metals can be recycled continually.

OTHER IMPORTANT ELEMENTS

Disposal of old batteries is covered under the 2006 Batteries Directive. Battery technology is moving on quickly and recycling processes are changing with it. Different types of batteries are handled in different ways, but they are generally stripped before crushing so that the lead, plastic, acid, cadmium and other elements can be safely removed and reused.

Catalytic converters are part of the new generation of products that have been designed for easy recycling, and as well as the regular ferrous and non-ferrous metals, valuable minerals such as platinum, palladium and rhodium can be extracted and recycled.

Currently, the majority of forklifts being scrapped are relatively old and have few electrical or electronic parts, but as the more modern generation of forklift begins to trickle through the system its electronic/computer-based elements will need scrapping, and handling very differently.

Today's recycling industry is continuously improving its ability to process and recycle these materials, and increasingly developing methods for extracting valuable metals and rare earths for use elsewhere in industry, finding uses for even the most mundane of materials such as seatbelt webbing.

YOUR FORKLIFT'S NEW LIFE

So where might materials from your old forklift resurface?

- **Steel** is sold on to the steel industry, melted down and turned into raw material. It could surface in a myriad of new products ranging from high-quality construction steel through to knives and forks, and nuts and bolts.
- **Copper** is reused in all types of electrical equipment, as well as in brass and copper products such as saucepans.
- **Batteries**
 - Constituents such as lead, cadmium, nickel and lithium are separated and purified then used as a raw material for other products including new batteries.
 - The acid is separated and treated for reuse or converted into other products such as gypsum which is then used in construction.
- **Plastics** from batteries or from the forklift carcass are converted into pellets and recycled as a raw material which is used in many products including new batteries.
- **Catalytic converters**

In addition to the regular metals, catalysts palladium, platinum and rhodium are either recycled for further use in the next generation of cats or:

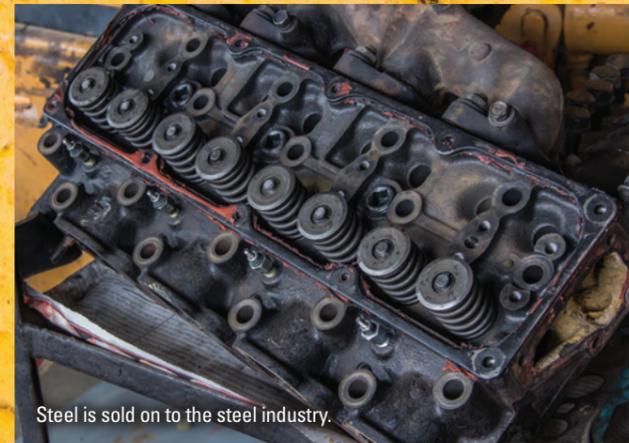
 - Palladium can be used in some dental fills and crowns, and in the ceramic capacitors found in laptop computers and mobile phones.
 - Platinum is often made into jewellery, so it could be around your neck or on your finger.
 - Rhodium can also be used to coat optic fibres and optical mirrors, and for crucibles, thermocouple elements and headlight reflectors.
- **Oil** can be used in a number of ways:
 - As combustion fuel in, for example, blast furnaces and space heaters.
 - It can be distilled into marine and diesel fuels through a process somewhat akin to oil refining.
 - Some oils will be suitable for full refining and this is determined by testing. During the refining process, all heavy metals, dirt and chemical impurities are stripped out. Part of the process involves dehydrating the oil and capturing ethylene glycol which is sometimes reused in recycled antifreeze.
- **Seatbelts** can be shredded, or bagged and sold by weight, and there are innumerable ways that craftspeople are able to convert them into new items. For example, they can be made into bags, wallets and even pet leads and harnesses.

It is worth noting that around the globe 40% of our raw material needs are now supplied from recycled materials, and that figure is increasing as we develop new ways of processing waste.

A surprising amount of a scrapped forklift reappears in everyday products, and these could be anything from an expensive engagement ring through to false teeth, and from the steel core of a high-rise building to the components in your mobile phone.

The old forklift never truly dies. ●

Article feedback is welcome: editor@eurekapub.eu



Steel is sold on to the steel industry.



Forklift battery materials may resurface in new batteries.



Catalytic converters contain valuable palladium, platinum and rhodium.



Oils can be recycled in many different ways.

EU REGULATIONS

2006 BATTERY DIRECTIVE

- Regulates what batteries can be made of to reduce hazardous elements
- Sets standards for waste management
- Disposal of industrial and automotive batteries in landfill is prohibited
- Target to recycle 45% of battery sales by 2016

WASTE FRAMEWORK DIRECTIVE 2008/98, ARTICLE 21 ON WASTE OILS

- Waste oils should be collected separately
- Defines how they should be treated
- Waste oils should not be mixed with dissimilar types of oil or other waste

END OF LIFE VEHICLE ELV

- Applies to passenger vehicles and light commercial vehicles – some authorities say this is applicable to forklifts, others disagree

WEEE

- Makes manufacturers responsible for the disposal of household electrical and electronic waste – this does not apply to industrial electrical and electronic waste

INTERESTING FACTS

- Recycled materials supply 40% of global raw materials needs

STEEL

- Almost 40% of global steel production is from scrap
- Recycling steel reduces CO2 emissions by 58%

LEAD

- 50% of the lead produced each year has been used before in other products
- 80% of lead is used in acid batteries, all of which is recoverable and recyclable
- Using recycled lead instead of ore reduces CO2 emissions by 99%

COPPER

- Almost 40% of copper used today is recycled material

ALUMINIUM

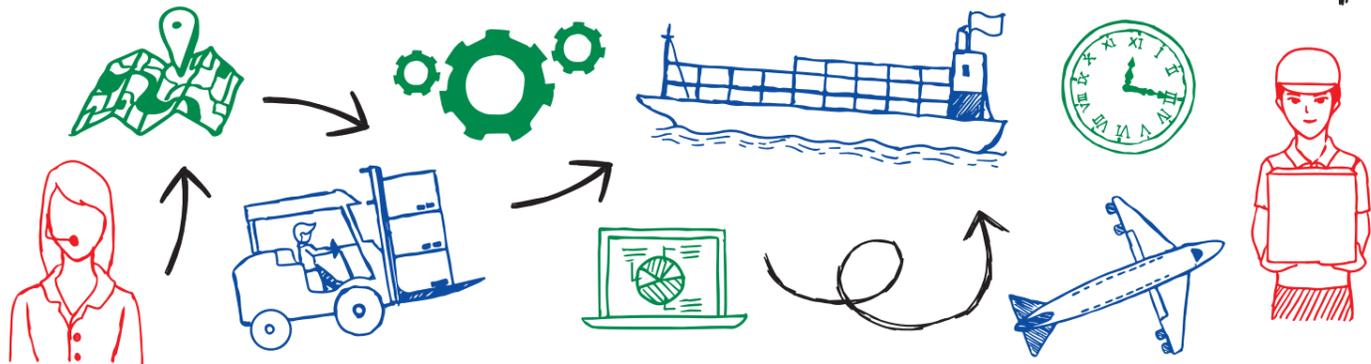
- Of the 700 million tonnes of aluminium produced since the 1880s, about 75% is still being used today as recycled material

(Source: Bureau of International recycling)

A WORD FROM THE PROFESSORS

HOW LOGISTICS SCHOOLS AND UNIVERSITIES WILL MEET THE INDUSTRY'S FUTURE NEEDS

Our 10th anniversary reflection, looking back and forward at the world of materials handling, would be incomplete without a word from those 'shaping' the logistics managers of tomorrow: our logistics schools and universities. **Gian Schiava** has interviewed two renowned logistics professors to gain a deeper insight into this area.



Our interviewees are **René de Koster** from the **Erasmus University in Rotterdam, The Netherlands**, and **Edward Sweeney** from **Aston University in Birmingham, UK**.

Eureka: How will the job description of the logistics manager evolve in the next five to ten years? What new skills will she/he need to learn?

René de Koster kicks off: "New technologies and insights from academic research come up all the time. The logistics professional needs to stay informed by attending fairs and seminars. In addition, it is important to keep on learning and developing by taking up more specific courses and engaging with researchers that bring the newest insights."

Edward Sweeney gives us his view: "Supply chains are becoming more: (i) technologically advanced; (ii) globally connected; and (iii) environmentally sustainable. The logistics manager of the future will need to have a range of skills and knowledge to deal with these three challenges."

"He/she will need to be highly technologically literate, particularly in terms of how information and communications technology (ICT) is used to facilitate higher levels of supply chain integration."

"He/she will also need to understand how to manage in complex international or global contexts. This requires a strong knowledge of international business and economics, as well as of cultural issues that impact on how supply chains are designed and managed."

"Finally, there will be a pressing need for skills in the area of sustainable supply chain management. This is concerned with business sustainability generally, in the context of increasingly competitive markets, as well as with environmental sustainability and green logistics."

Eureka: How do schools and universities offering logistics programmes need to adapt to the new needs?

Edward Sweeney explains: "The key is that programmes are co-designed by providers (i.e. higher education institutions in the case of university-level

programmes) and senior supply chain professionals from a range of sectors.

"In Aston's case, we have worked collaboratively with industry and professional bodies on the design of all of our programmes. These include:

- Foundation degrees and other work-based undergraduate programmes designed and delivered in collaboration with Royal Mail and JLR
- Full-time undergraduate programmes run as part of the Novus Trust, a consortium of over twenty leading UK businesses in retail (e.g. Sainsburys and Morrisons), manufacturing (e.g. Cummins and Muller) and providers of logistics services
- Executive postgraduate programmes in collaboration with the Chartered Institute of Logistics and Transport (CILT) and a group of companies

"The key here is to combine academic excellence with real relevance to the evolving needs of business. Aston has an enviable record in terms of graduate employability; it is this combination of excellence and relevance that's the key to this."

René de Koster adds: "Schools pick up by offering courses and programmes on new developments, e.g. data analytics, block chain or robotics. By nature, universities do not particularly focus on any new tool on the market, but rather on structural insights and methods that can be applied to a multitude of applications."

Eureka: What will be the profile of the future student in logistics?

René de Koster replies: "Students should first and foremost focus on fundamental techniques that cannot be learned on the job (e.g. computer programming, data analysis, statistical techniques, simulation modelling, analytical modelling and solving mathematical programmes)."

"In addition, they should learn an academic attitude (analysis, literature search, problem formulation, method selection). They should learn content-based courses, addressing state-of-the-art academic insights, and be confronted with practice through internships that stimulate problem formulation and solving skills."

Edward Sweeney responds: "We continue to be guided by the principle of developing "T-shaped" supply chain professionals. These are graduates who are equipped with specialist knowledge in core logistics domains such as inventory management, warehousing, transport planning and supply chain design."

'The logistics professional needs to stay informed by attending fairs and seminars.'



"However, in addition to this specialist knowledge and these skills there is a need for knowledge in relation to the wider context in which their specialist expertise is applied. In particular, the logistics manager of the future needs to be a change manager, a strategic thinker and a team-oriented player, as well as having business acumen and a strong understanding of the financial dimension of supply chains."

Eureka: What are the big differences between logistics education/learning programmes today and those ten years ago?

Edward Sweeney summarises: "The biggest difference relates to content. This reflects the shift away from logistics professionals being purely subject specialists to being supply chain change agents. My various comments above are relevant in this context."

"The other big difference is in how programmes are delivered. Education and learning is now much more learner-centric than in the past, with a strong emphasis on, for example, problem-based learning and the 'flipped classroom'."

René de Koster concludes: "Fundamentally, there are not so many differences. However, techniques develop, due to fast information processing abilities."

"For example, solving a large mixed-integer program (MIP) is now possible through faster computers, more memory, smarter algorithms and online databases, and more easily accessible programming tools. However, fundamentally, an MIP is still an MIP. Tools change as well (e.g. from Pascal -> C++ -> Python and Java) and of course the latest and best tools are used in education."

"The biggest changes are probably in the way courses are organised: many more massive open online courses (MOOCs), more case-based teaching and flipped classrooms, more use of the internet in conveying the message. In addition, continuous benchmarking/evaluations/assessments/accreditations have increased the quality level of education and made it more consistent." ●



OUR INTERVIEWEES



RENÉ DE KOSTER

René BM de Koster is a Professor of Logistics and Operations Management at Rotterdam School of Management (RSM), Erasmus University.

His research interests are warehousing, materials handling, container terminal operations and behavioural operations.

He teaches at several universities, and is the author or editor of eight books and over a hundred papers published in academic journals. He is editor of four academic journals, member of the European Logistics Association (ELA) R&D Board, member of the BVL Scientific Advisory Board, and the supervisory boards of the universities of Pisa and Helsinki, as well as Chairman of Stichting Logistica and founder of the Material Handling Forum.



EDWARD SWEENEY

Edward Sweeney is Professor of Logistics, Head of the Engineering Systems and Management (ESM) Group and Director of the Aston Logistics and Systems Institute at Aston University.

His research interests are in supply chain design and integration, with a particular emphasis on the divergence between theory and practice.

He has worked and lectured in over fifty countries in Europe, North America and Asia, and is currently a Visiting Professor at the University of Kuala Lumpur. He is an experienced researcher with over two hundred publications including books and book chapters, papers in international peer-reviewed academic journals, practitioner journal articles and conference papers.

Article feedback is welcome: editor@eurekapub.eu



YOU CAN PUT YOUR TRUST IN US



“*Impact's support has been phenomenal. They helped us specify precisely the right trucks and took on board all of the modifications we needed. We trust Impact implicitly with our fleet and have done for as long as I can remember.*”

Steve Watkin, Dispatch Manager at Polypipe.

At Impact we believe that your fleet should be exactly right for your business. As your business evolves so should your fleet. That's why we offer uniquely responsive agreements and support them with the most flexible financing packages in the industry - enabling you to maintain the most efficient fleet at the lowest possible cost.

BUILT FOR IT.™

To find out more about our flexibility and support and how it could help your business, call today:
Or visit www.impact-handling.com.

0800 169 9789

IMPACT

CAT[®]
Lift Trucks