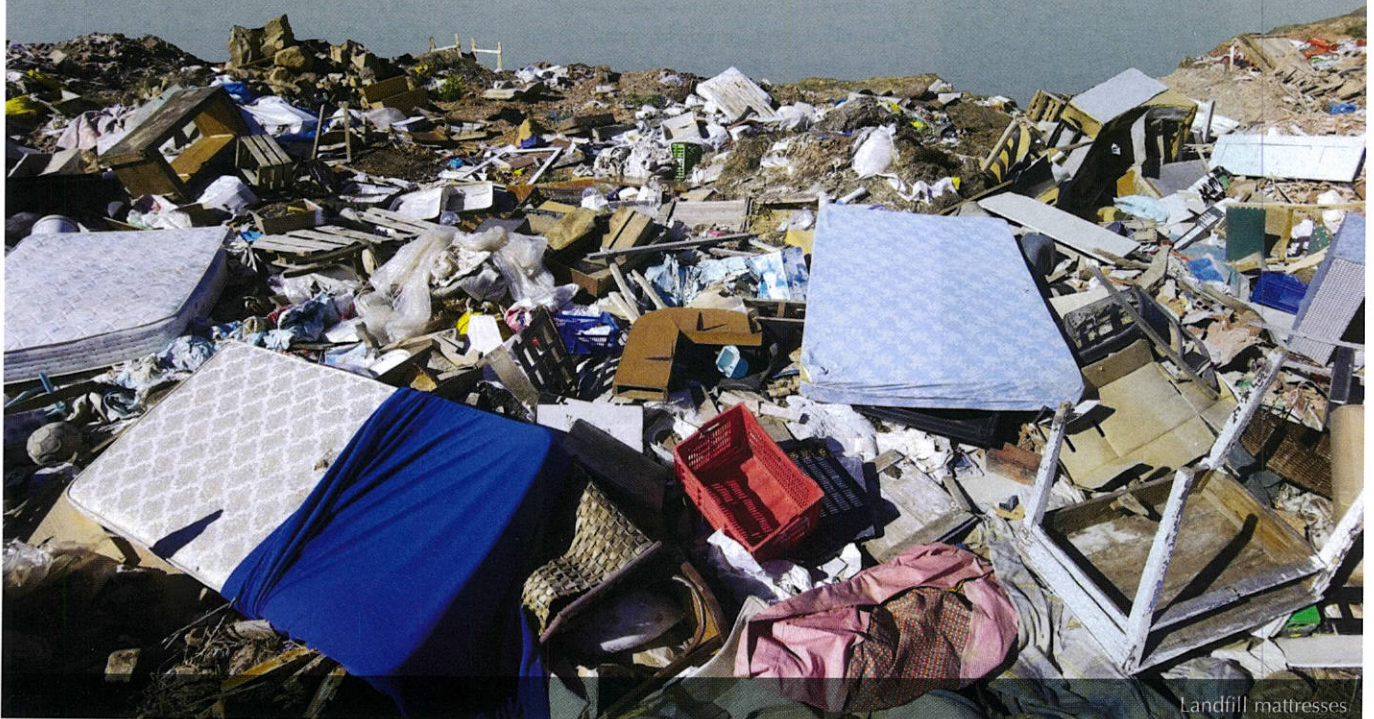


RECYCLING SPECIAL: EUROPE



Landfill mattresses

A major report into the status of End of Life (EoL) mattress recycling across Europe, commissioned by the European Bedding Industries' Association (EBIA), suggests the industry still has some way to go before a single, simple solution can be found. Jan Turner takes a look at the report's main findings and examines the state-of-play in France, the US and UK

When it comes to how the western world is currently dealing with the problem of discarded mattresses, the researchers at Ward Dupont, the company commissioned by EBIA to assess the current status, are unequivocal in their conclusion. There is no unique solution currently available.

Man has long been able to fly to the moon, can tweet the world in an instant and, thanks to the world's largest particle collider, identify the Higgs Boson to make one of the greatest discoveries in the history of science.

But we're still struggling to recycle old mattresses.

A presentation to EBIA's General Assembly at Budapest in September outlined the situation as it currently stands. And it does not make easy reading.

While progress is being made and recovery is seen as a crucial element of the EoL treatment portfolio, there are still many hurdles to cross.

As the report concludes:

- There are no large volume technologies/ applications in the development pipeline except gasification
- The current recycles market is unable to absorb EoL volumes – except steel
- Waste prevention is likely to impact product diversity and market value
- Selective collection and dismantling schemes have doubtful eco and HS&E (health, safety and environment) performance and are expensive



Discarded mattresses

- Schemes that involve Extended Producer Responsibility (EPR) costs being recharged to the consumer will become an element of competition

What is clear is that, across the EU, waste prevention and landfill elimination are top priorities. But the preferences on recycling and recovery technologies are very member state dependent.

This is a bit of a worry given that by the end of last year (December 2013), all member states were due to have submitted their 2014 -2020 waste prevention programmes and targets.

With up to 30 million mattresses annually reaching their end of life in the EU, it is estimated that 60% go to landfill and 40% are incinerated.

In terms of coming up with a single simple and effective solution, the biggest problem is the sheer diversity and mix of fillings found in

mattresses – PU foam, steel, latex, synthetic fibres, mixed fibres, natural fibres, synthetic non-wovens and polypropylene.

PU-foam and latex are both thermoset materials which mean they can't be either melted or restored. Once they come to their end of life in a mattress, any second generation application must have less demanding functionality requirements. Most of it is currently sold on the trim foam market.

And, then there are the springs.

Springs make the whole process especially tricky because steel is quite simply incompatible with any mattress recycling/ recovery options. Spring mattresses must be dismantled to allow the springs to be separated from the other materials – they can't be restored but can go into the 'old metals' recycling market to be used in the production of virgin steel.

WHAT IS AMERICA DOING?

In America an estimated 20 million mattresses and bases are taken away from homes and hotels each year and while non-profit and for-profit ventures alike are increasing their efforts to transform discarded materials into new products, there's still a huge gap between the number of mattresses being recycled and those that end up in landfill.

At the heart of efforts to establish a national system for mattress recycling is the International Sleep Products Association (ISPA) which has just created America's first Mattress Recycling Council, its purpose being to establish a framework recycling programme for implementing legislation.

ISPA has been involved in recycling issues for some 20 years and its goal is to encourage the development of a self-sustaining infrastructure for handling used bedding so that steel and other components can be efficiently extracted from beds and put to new uses.

At the moment there are some 30+ mattress recyclers in the US. Most are small non-profit organisations and use manual labour to dismantle mattresses. Discarded mattresses currently go to landfills and incinerators, used furniture stores/charities, renovators or recyclers.

"Getting rid of mattresses in a responsible way isn't easy," said Ryan Trainer, president of ISPA. "A growing number of landfills don't want them since they are bulky, hard to crush and can jam machinery.

"There are third parties that will take or buy used bedding from retailers but many of them are unscrupulous renovators who often just sew a cover over a filthy used mattress, making no effort to properly sterilise the old bed or meet national fire safety standards and then deceive the consumer into thinking they are buying an all-new mattress."

But change is afoot. In 2013, America's first mattress recycling law was agreed in Connecticut in May, closely followed by Rhode Island in July and California in September. All require the creation of a non-profit organisation to develop a mattress recycling plan funded by a small fee collected at retail. They will also need to create financial incentives for industry participation and establish fee and

programme objectives that are transparent.

The implementation date for Connecticut is 2015 with Rhode Island and California set to follow in 2016. Ryan added: "It's a terrific example of how an industry can work together with state officials to craft legislation that will increase used mattress recycling without damaging our industry or threatening jobs."

ISPA's close involvement in negotiating the new legislation has ensured industry support and a model for other states interested in introducing similar laws.

The benefits of ISPA's approach are that it creates a private sector solution that places the least financial burden on government and industry. It also distributes financial responsibility uniformly, demonstrates the industry's commitment to working to improve the environment, increases the volume of mattresses recycled and also creates recycling jobs.

Given the scale of the problem in the States, where an estimated 50,000 mattresses are discarded each day, it's a small but significant start to tackling the End of Life issue and ISPA knows there is much more to do. It lists its next tasks as being to develop and launch new funding and recycling programmes, to change state laws to allow the use of clean recycled materials in new mattresses, find other uses for recycled bedding materials, improve scrap preparation processes and mechanise dismantling operations.

Ryan added: "With mattresses going to landfill occupying as much as 23 cubic feet of space apiece, an efficient recycling solution is needed. Communities across the nation are growing stricter about what can be disposed of in landfills, raising tipping fees or banning the practice of accepting mattresses entirely.

"Recycling offers the industry a responsible solution to the problem of mattress waste that protects the environment and the public and conserves resources.

"As interest in recycling grows, we as an industry need to offer more safe and efficient venues for disposing of mattresses in a way that meets consumers' expectations."



Lifting topper

In fact, any sort of high volume recycling is quite difficult for mattresses because there are so many different fillings, each with their own problems. And so many barriers and restrictions to what can be processed. Minimum density, for example, is an important barrier in markets where weight reduction is key.

SO WHAT ARE THE OPTIONS?

In terms of waste prevention, one would be to bring mattress thickness in line with technical requirements, but the implications of this are clear: a conformity that could threaten competitive edge.

Manufacturers could also improve spring/foam/latex durability to extend the usable lifetime of a mattress. As the report author points out, this makes it sound an easy option with high potential; whereas in reality, currently used products exist in most cases for 20 years plus and have been permanently optimised over the years. It would take a fundamental breakthrough to generate a sizeable effect. And, should that happen, the effect on sales through a lengthened replacement cycle is self-evident.

PU foam and latex could be produced to find the optimal balance between density, functionality and durability. Again, far more complex than it sounds: and what happens then to new product development and innovation?

Developing designs that involve minimum trim make sense but are probably harder to achieve than the idea sounds, as is design for maximum use of recycled materials.

And the idea that everyone could strive for homogeneous cover architecture (all natural or all synthetic) is likely to be blown out of the water by manufacturers whose very existence depends on points of difference, not similarity.

All of which makes the notion of waste prevention admirable but non-commercial.



The re-use of mattresses and mattress renovation is necessarily discussed but just as quickly dismissed. It exists only in America says the report. There is no culture or appetite for it in Europe and it is quickly acknowledged that this is a situation that should not change.

Composting/fermenting is a consideration for natural fibres – provided they are first flocced. But both processes take three to six weeks to convert the waste into humus, a cycle time that is again limiting as a large scale solution – along with the size and seasonality of the humus market.

Waste to energy solutions offer a mature technology which is technically and environmentally proven to be safe and with a vast network of facilities across most member states. It can handle all EoL materials except steel and does have the advantage of being a net saver of greenhouse gas emissions. But at the end of the day this is an incineration process and its political acceptance is very country dependant.

Remelting and extrusion processes for synthetic fibres produce good quality recycled materials – but the cost involved is no different to that of virgin materials. And chemical recovery of the polyurethane fraction is still seen as a process with multiple limitations and conditions making its application potential rather limited.

Gasification offers more possibilities with Ecoloop, part of Germany's largest building materials group, having introduced novel chemistry/technology that claims exceptionally high thermal efficiency and a process that can handle all EoL mattress materials except steel. It yields a gas that can be used as a fuel replacing natural gas, converted to electrical power or used as a base chemical but performances are still to be demonstrated on a sustainable basis.

So where is Europe going?

In France, extended producer responsibility

legislation has been in place since early 2012 with Eco-Mobilier currently the non-profit EPR organisation that the rest of Europe is looking to. (See the information on what Eco-Mobilier is doing in France on page 18).

In Belgium EPR preparatory discussions for the Flanders region is in its final stage with

legislation thought to be imminent – and most probably expanded to other regions.

In Italy, Spain and the UK, EPR discussions are at an early stage.

Some member states – namely Austria, Belgium, Denmark, Germany, Italy, Norway, Sweden and Switzerland – have already

WHAT IS FRANCE DOING?

The French are proving pioneers when it comes to the hot topic of the End of Life of mattresses with Eco-mobilier among the leading organisations taking up the challenge.

In a country where more than 50% of furniture waste and 100% of waste mattresses end up in landfills, Extended Producer Responsibility (EPR) schemes – of which there are currently 21 in France – are seen as the best way to divert the waste from landfill and also to transfer waste management costs from the municipalities to producers. EPR schemes currently represent a saving of around 1,000 million euros to local authorities and are expected to reach 1,500 million in the next five years.

A furniture EPR scheme was created in 2009, the target for 2015 being to reuse and recycle 45% of household waste. Mattresses represent 7% of waste furniture and it is thought to be technically feasible to reach a 90% recycling rate if they are not wet.

The new furniture EPR scheme made producers responsible for organising and financing the system. They could either do it themselves (expensive) or join a collective. In 2011, 24 companies (12 retailers and 12 manufacturers) created Eco-mobilier, a state approved, not-for-

profit private collective. It is financed by a visible recycling fee, added to the price of products and clearly shown as a separate charge on in-store point of sale and paid for by the consumer.

Today 100% of products put on the market pay the recycling fee, although only around 30% of waste mattresses will have been collected and recycled in 2013-14. The idea is that the recycling fee, set annually by Eco-mobilier, will progressively increase until 2017 when the scheme will be completely operational across France. By that time it is estimated that the total cost of the programme will be around 8.2 billion euros – some 4% of the industry's turnover.

There are currently three mattress recyclers operating in France, although more are wanted. They collect used mattresses either through a central point (80%), kerbside collection or through a retailer take-back system.

By the end of 2015 Eco-mobilier has to set up financial incentives for products that have a lower End of Life environmental impact – mandatory for all EPR schemes in France. To do so, working groups aimed at defining the environmental criteria have been set up, with the first results of the study due at the beginning of this year.



Spring box



Stripper

and partnerships with recyclers.

Mattress disposal and recycling in the UK has been the subject of numerous reports in the past couple of years, including one commissioned by the National Bed Federation in 2012. With one eye on reducing landfill and in particular high caloric waste in landfill (including mattresses), DEFRA* and WRAP* have also been exploring the options for diverting mattresses for landfill. Most of their reports come to a similar conclusion: that the absence of legislation or government guidance may be one of the biggest barriers to banning mattresses from landfill and encouraging recycling.

This is particularly relevant given that local authorities currently handle around 85% of discarded mattresses – 166,500 tonnes in 2011 alone and expected to rise to 215,000 tonnes by 2016. It is currently estimated that at least 75% of councils dispose of them through landfill. Despite the attractions of being seen to be green and reducing landfill, the current cost to councils of landfill tax is still considerably less than the gate fee recyclers are charging to collect them. And that's not even addressing the challenge of delivering product that is dry i.e. using closed rather than open-topped skips.

Mattress construction in the UK is generally more complex than in Europe because we favour layers of multiple fillings, pocket sprung interiors and tufting, all of which are considerably more challenging to dismantle and sort. So, for the moment, manual dismantling is seen as the only viable method – although automated processes are being researched and trialled and may not be too far away. The volume of old mattresses required to feed an automated process however is going to be considerable, so the logistics of collection need to be resolved.

And then there is the question of what to do with the recyclate materials produced. Most of the recyclers today are claiming near 100% recycling – into insulation materials for building and automotive industries, carpet underlay, animal bedding etc to name but a few. Many are understandably cagey about the markets for their recyclates, which may have been hard to identify, viewing it as commercially sensitive information.

But the NBF is concerned about transparency and fears that recyclates are finding their way back into the mattress market in unacceptable ways. It is partly in response to these concerns that the association has developed its audited NBF Approved Code of Practice in a bid to ensure members and encourage non-members to steer well clear of unclear fillings/materials or old spring units with insulator pads still attached.

In a similar vein, there are concerns about

banned landfill of high caloric waste. Finland is in the process of doing so.

And the outlook?

According to the EBIA report, landfill phase-out for high caloric waste is expected to be completed by 2018-2020. And we can certainly expect to see the EU exercise major pressure on waste prevention.

More member states will also establish EPR legislation along the lines of that now operating in France – but the risk here is inconsistency.

As the report points out, the world economy has no other option than to move towards a 'circular economy' in which material recycling and resource efficiency are the fundamental building blocks.

It means waste prevention and elimination of landfill will be instrumental in achieving a circular economy.

But as yet, and as the EBIA report so succinctly concludes, no single, simple

solution is out there to make this an easy circle to complete.

WHAT IS THE UK DOING?

Unlike some countries, the UK mattress industry has been engaging in recycling for some time with a number of small scale recyclers – mostly manual – dismantling mattresses and selling on the materials they produce.

These businesses have set up commercial deals with bed retailers and manufacturers wanting to engage in recycling in order to be 'green' and who, in most cases, pay them a gate fee. The total amount of mattresses being recycled this way is thought to be less than 100,000: a fraction of the millions (an estimated five-six million plus) of mattresses being disposed of annually. In addition, a small number of local authorities (who, in total, dispose of by far the largest number of old mattresses) have set up collection services

a wider market for reconditioned mattresses being encouraged without any appropriate standards or labelling requirements.

WRAP has explored the options for secondhand mattress re-use and while this may occur in a small scale, non-commercial way, with private individuals giving away mattresses via recycling websites; or manufacturers passing on barely used returns to charities – it is not considered a viable or desirable commercial option for mattresses, from both hygiene and comfort aspects.

Recovery – incineration for energy production – is another option being explored in order to divert mattresses away from landfill. But the fact that spring units do not burn is a barrier to their attractiveness to incinerator owners. At the moment they are simply not welcome. Again process research is underway in Europe which may eventually make this option more viable.

Meanwhile, the UK is looking closely at feedback from those countries which have already introduced extended producer responsibility legislation for mattress recycling, as this could become a real possibility for the UK in the next few years, particularly as next year the EC reviews the Landfill Directive, which affects all EU countries. The important thing is to engage with government at an early stage so that industry is part of the solution and does not have expensive regulation imposed on it. But, says the NBF, solutions must be workable and economically viable, ethical in their own right and properly regulated.

In this melee of market driven, be-seen-to-be-green activity, coupled with government policy and pressures, solutions are beginning to emerge. Many will not yet even have been thought of or invented. The main objective is to divert mattresses from landfill and everyone agrees this is desirable. There is optimism that where there's a will, there will be ways.

MATTRESS RECYCLING

As landfill becomes an increasingly expensive and unacceptable disposal route for mattresses, a growing proportion of this 'difficult waste stream' is going to recycling companies.

The Furniture Recycling Group is one such business. Headed up by MD Nick Oettinger, a former waste management consultant, the business originally started out as EoL some three years ago when in his first week of business Nick recycled precisely one mattress.

Today the business has grown significantly and across its original Preston, large new Ilkeston and franchised-out North Wales sites, TFRG processes some 4,500 mattresses a week. And plans are in hand to open new sites in Bristol (early next year) and London and Birmingham during 2014.



NEW UK INITIATIVE

A new mattress collection and recycling service – the first to operate in the UK on a national basis – launched at the end of last year for both the trade and consumer.

'Collect and Recycle' is the company operating the new service and is being run by the people behind Network 4, an established player in the furniture and furnishings home delivery sector.

Sales director Vinny Riley said: "Network 4 has been offering a used mattress collection and disposal service to high street retailers, bed manufacturers and wholesalers for some years – but only where we have been delivering new goods.

"Initially, all the mattresses we collected were sent to landfill, but we became increasingly concerned about the environmental effects of doing this. Through one of our trade customers we sourced a recycling company – JB Waste – that already deals with a number of major bed manufacturers and we have been sending mattresses for recycling rather than landfill for our Network 4 customers for a while.

"The idea behind launching Collect and Recycle is that, using Network 4 distribution channels and vehicles, we now offer a collect and recycle service to anyone – including consumers through our www.collectyouroldbed.com website – across the whole of mainland Britain. The

mattress collection service is no longer confined to those companies for whom we deliver new products.

"We are the only people currently offering a mattress collect and recycle service on a national basis. Many local authorities offer a service within their area and there are some private regional companies – but no-one else offers the complete geographic spread."

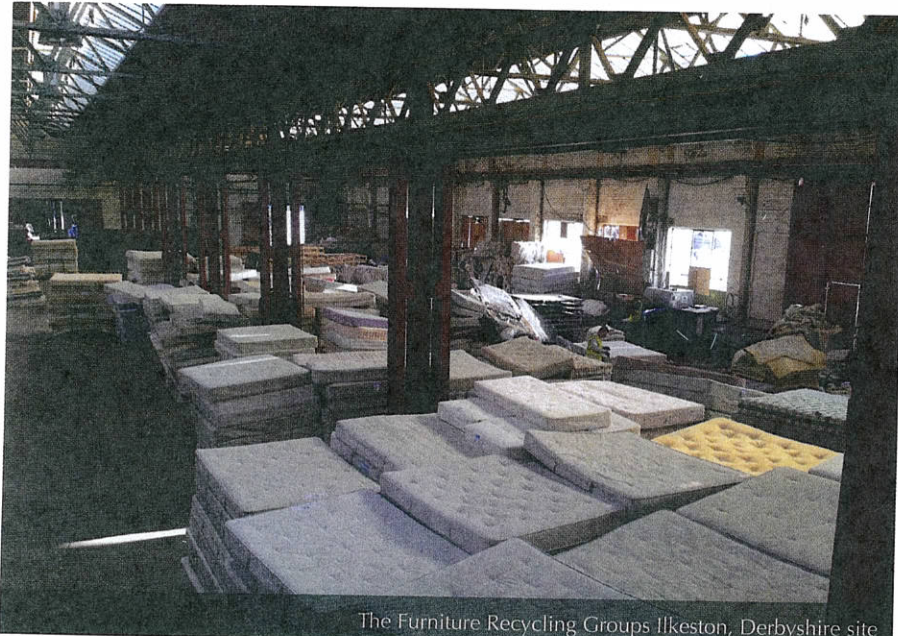
Using the Network 4 delivery fleet, Collect and Recycle provides a two-man collection team who fully wrap all discarded mattresses to prevent any cross contamination. A scale of corporate charges applies to commercial customers – consumers can expect to pay from £9.99 for the service, depending on whether they are looking to dispose of a headboard, mattress only, complete divan set or other option.

Vinny added: "The mattresses are fully recycled for use across a range of products including upholstery fillings and underlay. This is something that is becoming of increasing concern to consumers as well as everyone across the industry – and it's not an issue that is going to go away. We aim to make the new Collect and Recycle service as simple and economic as possible to use and feel that by launching the first national scheme for mattress recycling we have taken an important step forward for the whole industry."



The new Collect and Recycle scheme uses the Network 4 fleet and distribution channel

*DEFRA - Department for Environment, Food and Rural Affairs
*WRAP - a government funded organisation which helps businesses, local authorities, communities and individuals reap the benefits of reducing waste, developing sustainable products and using resources in an efficient way.



The Furniture Recycling Groups Ilkeston, Derbyshire site

Nick says: "The average mattress has a volume of 23 cubic feet and with 7.5 million mattresses discarded in the UK each year, the landfill space that is used is enough to fill Wembley Stadium over five times each year!"

No wonder then that the gatekeepers of such space are increasingly disinclined to allow mattresses to take up valuable landfill.

"What's further pushing it is the Landfill Tax Accelerator which goes up £8 a tonne every 1 April," said Nick.

It means that proportionately the cost of recycling is becoming more persuasive – especially, as Nick pointed out, that consumers themselves are becoming more eco-conscious and demanding that discarded mattresses are disposed of in a more environmentally thoughtful way.

This growing awareness of the need to recycle the contents of a mattress rather than accept it will ultimately go to landfill is one that is likely to tax the minds of manufacturers themselves. For it could be that unless the industry regulates itself on this front, a government directive along the lines of the Waste Electrical and Electronic Equipment (WEEE) directive – said to have had serious cost implications for the electricals sector – could be imposed.

As it is, the vast majority of mattresses still end up in landfill and businesses such as TFRG are, between them, still only scratching the surface of a mountainous problem. And there is currently no 'one size fits all' approach to recycling mattresses. The operators who do exist largely rely on manual labour but otherwise operate in quite varying ways.

"The important thing, as far as we are concerned, is that we are completely open and transparent and operate a best practice policy," said Nick.

Mattresses come in to his sites from retailers,



Disassembling the mattresses

local authorities, manufacturers, transport companies (who deliver new and uplift old beds), hotels, universities and holiday parks. But the biggest customer is a waste management group for whom TFRG is a specialist sub-contractor.

Once delivered, the discarded mattresses are manually opened, disassembled and segregated into waste streams: springs, soft pads, hard pads, needle punch, polyester, poly-cotton mixes, different tickings and foams, horsehair and coconut fibres.

"We have to follow a 'waste hierarchy', which essentially means reducing the amount of waste produced and re-using what is being thrown away, either in full or in part.

"Absolutely no mattresses leave here in full – everything is broken down with a full audit trail and chain of custody to ensure environmental compliance. All mattresses are logged in on delivery and a waste acceptance note is

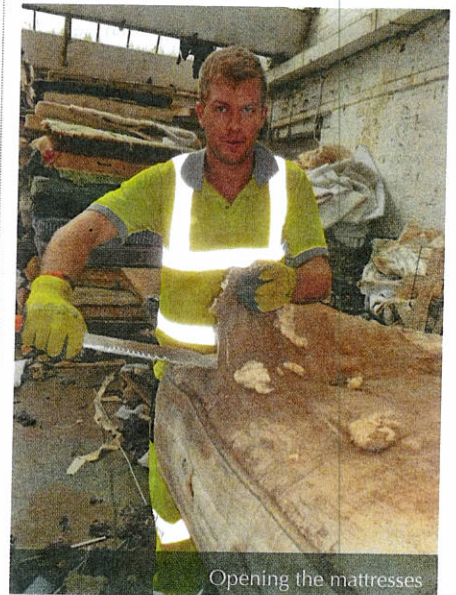
completed to start the audit trail. Everything that goes out is dealt with on a sales collection or waste transfer note."

Nick said that around 96% of what comes in is recycled. Textiles go to six different processors, springs are largely sent for scrap, foam is sent for granulation into padding and underlay products and clean wood is sent to be reprocessed for chipboard.

Contaminated wood and textiles are used for energy from waste – i.e. incineration, which is not classed as having been recycled.

Nick added: "We are working with some members of the NBF to create a circular economy and a cradle to cradle solution that enables products to be put back in to the industry. We have dealt with WRAP on a couple of circular case studies."

This so-called circular economy currently remains something of a holy grail for the bed industry, but if the burden of cost of recycling does eventually fall to manufacturers, then



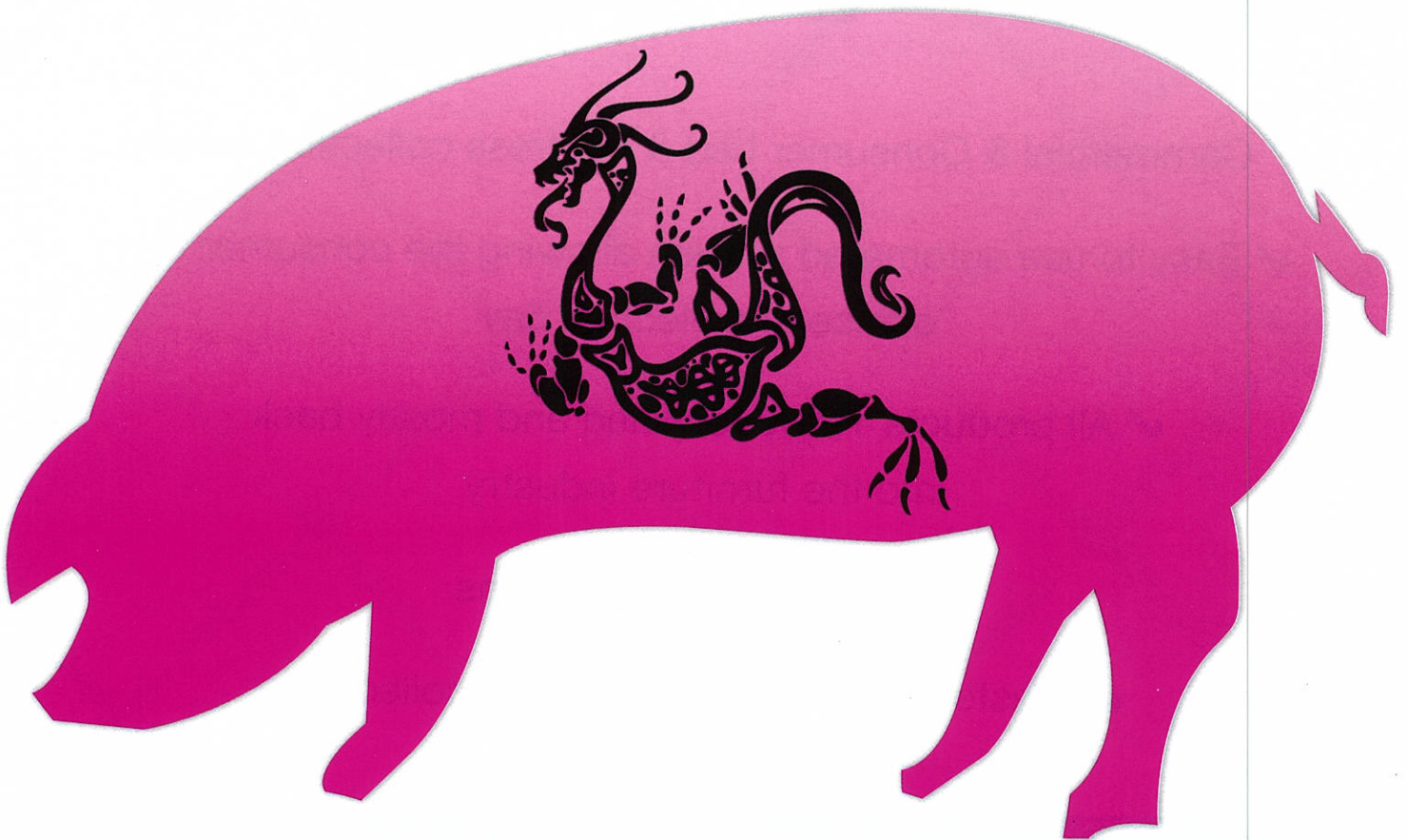
Opening the mattresses

it may focus minds that are not currently convinced of the need to tread that path.

Nick added: "As and when legislation does come in, there will be 10 million mattresses a year that can no longer go to landfill and it will be the producers who have to pay for this. We are now working with a number of manufacturers to discuss their take-backs and even talking about designing mattresses with end-of-life solutions in mind.

"Recycling has to be the way forward. At the moment, recycling mattresses remains something of a niche sector but we know from our own growth and the way the political climate is moving that it is a solution that the industry will increasingly need to move towards." 🌱

THE TATTOOED PIG STRATEGY



What have a tattooed pig and Nespresso coffee makers got in common? And more to the point, what can the bed industry possibly learn from them?

The answer, according to Australian business strategist and author of *The Fine Art of Success*, Jamie Anderson, is the kind of innovation that creates new markets. And a way of thinking that the bed industry could employ in the face of declining sales.

As one of the keynote speakers at the European Bedding Industries' Association's Budapest conference in September, Jamie Anderson was addressing a European-wide audience of bed makers and suppliers up against a market that has seen a decline in the volume of sales since 2007.

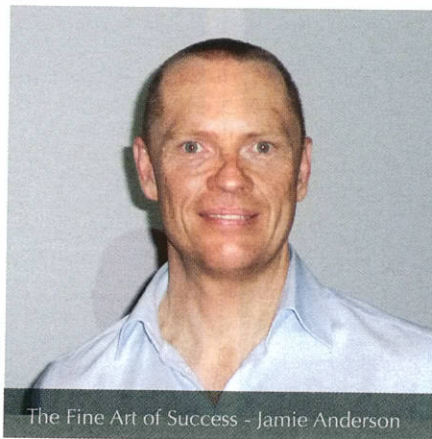
He said: "I would like to suggest that if you keep doing the same things and failing, take it as a sign you are doing the wrong things and not a sign that you are not working hard enough."

It is, he believes, more about being creative, thinking outside of the box, and aiming for a clear and segmented audience. It can even be about creating a whole new market and making people aspire to something that they may never previously have realised they wanted or needed. Such as a tattooed pig.

The brainchild of artist Wim Delvoye, the tattooed pig involved a Damien Hurst level of thinking in terms of creating something that had never been done before. It was an idea that took 15 years to evolve and having developed and created his protégé pig, the Belgian artist sold it to the very wealthy Mr Roman Abramovich for two million dollars.

The pig is now a regular in the boardroom of said billionaire's mighty yacht, the *Eclipse*, where it is regularly seen by business colleagues who naturally all want one too.

Essentially, Wim Delvoye took a commodity item, created a USP, repackaged it, identified his market and then set out to capture it. Along the way he learnt how to keep pigs, do tattoos and market it



The Fine Art of Success - Jamie Anderson

"Essentially Wim Delvoye took a commodity item, created a USP, repackaged it, identified his market and then set out to capture it"

appropriately. This involved buying free-range woodland in China where he was able to capture images of happy, carefree pigs.

His unique 'product' was aimed at someone with the money and desire to own something with scarcity value. An instantly recognisable pig that would bring its owner widespread media attention for being the first person in the world to own a tattooed porker.

And he captured his audience by negotiating an exhibition opportunity at the Louvre in Paris to which he invited the wife of Roman Abramovich. She was sold and Wim Delvoye was made. For those in the market, you can now buy a tattooed pig either live, stuffed or skinned.

"Everything you do in your companies should align with the end customer in mind," said Jamie. It's a lesson in the 'creation of

desire' also nicely illustrated by Nestlé, the makers of Nespresso coffee machines and consumables.

Worth four billion euros last year, the market for 'luxury coffee' didn't even exist 10 years ago. It was created by selling direct to the consumer via the internet.

Jamie said: "Nestlé educated people to want Nespresso and created a market that didn't exist a decade ago. It was clearly aimed at double income households – people who do well and want to treat themselves occasionally. They created a product that people want to bring out at dinner parties and show off – which in turn generates a desire in others.

"Why couldn't the same be done in the bed industry? Sometimes we have to enlighten and educate the customer with stories and emotions and non-tangible benefits. You have to tell people what they want.

"These people innovated but a lot of big companies don't have the ability to create and think differently.

"It's about overturning assumptions and not being afraid to ask 'why?' If you have a company where people are not brave enough to make mistakes and do something silly then you are never going to move forward.

"It's about coming up with a value proposition and benefits that you can define. In the bedding industry there are over 1,000 different attributes that you can communicate, so it's about communicating the attributes that your customer values. It is also about identifying your most valuable customer and asking why?

"But most of all, when a product fails, it is recognising that this is a sign that you need to do things differently not that you are not working hard enough."

Tattooed pigskin mattress anyone? 