Experiences from madras collection trial in selected municipalities

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DTU SUSTAIN
InnoMission4: Mattresses
– new Reuse & Recycling Systems

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EXPERIENCES FROM MADRAS COLLECTION TRIAL IN SELECTED MUNICIPALITIES

Collection, sorting and treatment of mattresses for investigating how a better recycling can be done - but requires a special focus from the municipalities.

KEYWORDS: Increased recycling, mattresses, recycling facilities in Denmark.

SUMMARY

Mattresses constitute a problematic waste fraction. A far better recycling of mattresses would ensure less incineration and thereby reduce the CO2 emissions. In the autumn of 2021, the Municipality of Copenhagen, Odsherred Municipality, Vejle Municipality, ARC, Vestforbrænding, ARGO, and the Capital Region established a partnership for circular solutions for mattresses. Since 2022, Bramming Plast Industri, Danfoam/Tempur-Sealy, and DTU Sustain have also joined as partners. DTU Sustain are responsible for evaluating data, citizen behavior, and solutions for collection challenges regarding mattresses in the research project. A recently conducted pilot test shows promising results but also highlights the need for specific solutions for collection via recycling facilities and bulky waste collection.

BACKGROUND

As part of the partnership, a collection trial with mattresses from recycling facilities and bulky waste collection schemes was carried out. The purpose was to gather information on the quantities of mattresses we can collect, the types and qualities of the mattresses, and the requirements at the collection stage. Mattresses from Vejle Municipality, Odsherred Municipality, and Copenhagen Municipality were transported to RetourMatras in the Netherlands for treatment tests throughout 2022 to evaluate quality and opportunities for recycling.

THE COLLECTION: What went well?

We received plenty of mattresses and can conclude that a targeted effort is effective. Although some wet and dirty mattresses had to be sorted out at RetourMatras, they were able to process the majority (excluding box mattresses), and the quality of the cleaned material was good.
The trial was well received by the recycling supervisors, who are keen on seeing more recycling and could sense that citizens were informed about the trial and willing to drop off mattresses. Citizens came from a wider area to drop off their mattresses, indicating that the communication had reached them. Visible and communicative recycling supervisors on site, focusing on sorting criteria, guided citizens who were unsure whether their mattresses were suitable for recycling.

We accept	We do not accept
• Dry and whole mattresses • spring mattresses • Latex mattresses • Foam mattresses • Mattress toppers • Box mattresses with wooden frame	• Wet, musty and very dirty mattresses • Cushions • Roll-up mattress • Bed sheets • Duvets • Bed frames and legs

Picture: The information material that the recycling facilities displayed during the pilot test.

Picture: mattresses that has been collected in Copenhagen municipality.




Picture: Mattresses collected in Odsherred minicipality (summer vacation house) that illustrates the challenges with assuring that the mattresses stay dry.

WHAT WAS CHALLENGING?

1. To ensure (reasonably) clean and especially dry mattresses: Water leaked into some of the bulky waste sheds.
2. To have enough space to move and sort the mattresses.
3. To be able to make the right discretion (citizens and waste facility staff).
4. To explain to citizens why dirty mattresses and cushions were not suitable for the trial.
5. To lift especially wet mattresses - heavy and difficult.
6. To have a separate vehicle: Not all municipalities had the opportunity to collect mattresses with a separate vehicle.

10 recommendations for the recycling facilities

Recycling centers can consider the following if they want to collect mattresses for recycling:

1. Involve site staff in the project from the beginning to ensure ownership and minimize sorting errors.
2. Logistics, procedures, and responsibilities defined from the begining.
3. Mattresses must be collected in a completely sealed and clean container (e.g., shipping container for transport) - and the container must be kept closed during rainy weather (e.g., a walk-in container or a container with a chute where mattresses can be tipped into).
4. If space allows: Have a reserve container available for when the other one is filled or emptied.
5. Clear communication on what defines an acceptable mattress.
6. Test different methods to prevent mattresses from being dragged on the ground, or use covers for the mattresses.
7. Experiment with facilities for citizens to dismantle legs, springs, and fittings themselves.
8. Clear marking on the site that can be read by citizens from a distance and makes it easy to navigate (e.g., banners).
9. Visible and communicative employees on site, focusing on sorting criteria and guiding citizens who are unsure if the mattress is suitable for recycling.
10. Communicate from the start on as many media platforms as possible, so citizens, at the moment they decide to dispose of a mattress, can assess whether the mattress is good enough for recycling.

10 recommendations – bulky waste

The following considerations can be taken into account to ensure dry and clean mattresses during bulk waste collection:

1. Avoid dragging mattresses on the ground – provide covers to protect the mattresses.
2. Assign two employees to the vehicle for handling large mattresses and mattress toppers.
3. Collecting mattresses as the last, to avoid the bulky wast is an obstacle for collecting the mattresses.
4. Schedule mattress collection as the last task to avoid obstruction by other bulk waste.
5. Use stickers that indicate that the mattress will be collected later by another vehicle.
6. Have the bulk waste district mark areas where mattresses are located, so the recycling vehicle only goes where mattresses are known to be collected.
7. Investigate if a dry corner of the bulk waste storage room can be designated for mattresses (requires the involvement of the caretaker).
8. Consider supplementing with sidewalk collection during dry periods in the summer.
9. Have a dedicated vehicle only for mattresses to allow for tight packing.
10. Consider implementing new contact systems for pickup, such as citizen calls/contact forms and the option to order mattress covers.
11. Ensure everyone is on board and take ownership, so unsuitable mattresses are not left for the mattress vehicle.

Results from the collection experiment

The collection test included both box spring mattresses and soft mattresses without wooden frames. A fraction was transported for treatment testing at RetourMatras, which, however, could not sort box spring mattresses. The results suggest a sorting rate of over 60% with modern treatment methods for bulk waste (where the waste is crushed, and wood and metal are sorted out). However, the situation is quite different for soft mattresses, where only 22% of the weight on average consists of metals. These are already recycled in the current treatment system. The mattresses contain a large amount of PUR foam (up to about 41%) and textiles (up to about 14%), which can only be recycled if the soft mattresses are collected separately. It is estimated that recycling rates of up to 80% are realistic for this fraction. Summary:

1. Foam, the largest and heaviest fraction in mattresses (31-41% of weight in soft mattresses), is not currently recycled, but treatment solutions and demand for post-consumer foam exist.
2. Separate collection of mattresses is feasible.
3. Box spring mattresses may not need to be included in the mattress waste stream initially.

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Referencer

https://circularcph.cphsolutionslab.dk/cc/partnerships/partnership-for-circular-mattresses

Partners in the project

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