

IMPROVING RENOVATION WASTE MANAGEMENT IN SWEDEN: THE ROLE OF THE DEMOLITION COMPANY

Rickard Andersson¹, Martine Buser² and Petra Bosch³

^{1&2} *Division of Construction Management, Department of Architecture and Civil Engineering, Chalmers University of Technology, SE-412 96 Gothenburg, Sweden*

³ *Technology Management and Economics, Service Management and Logistics, Chalmers, Vera Sandbergs Allé 8, Gothenburg, 412 96, Sweden*

Recent directives expressed by the European commission are targeting that 70 percent of non-hazardous construction and demolition waste should be recycled compared to the current ratio of 50 percent. The common assumption is that these goals are achievable by putting pressure on the construction industry. It is however unclear how these figures can be achieved. Even though there's been a strong focus on waste management activities within the construction management literature, especially during the design and construction phases, the actual work performed by subcontractors is often missing. In particular, the role of the demolition company that is in charge of both the handling of waste on site and its distribution afterwards is overlooked. This paper aims at identifying and analysing the perceived challenges met by these companies to increase recycling. To do so, we build on institutional work which enables us to identify taken for granted institutionalized behaviour on a micro level. Drawing on qualitative research methods, we collect empirical material through semi-structured interviews with both site managers and demolition subcontractors and observation of practices on site of renovation projects in the region of Gothenburg, Sweden. The result identifies how current institutions are maintained and reproduced, preventing the development of new practices and which actors may disrupt the existing institutions and thus enable change towards more sustainable waste management practices.

Keywords: barriers, waste, demolition, institutional work, sustainable agenda

INTRODUCTION

The focus on sustainable goals and the development of circular economy concepts have put the construction sector under pressure to reduce its consumption of material and energy. Whereas the construction processes have improved, the sector is still a major contributor to the large amount of waste generated annually within the European union being responsible for 25-30% of the total amount of waste. In an attempt to decrease these figures, the European commission is maintaining its pressure by issuing again directives aiming at increasing the amount of non-hazardous waste recycled to 70% (European Commission, 2016). Accordingly, the sector needs to improve and align its practices towards the new targets; waste should either be

¹ rickande@chalmers.se

avoided or reduced by optimization of material and processes and start to produce benefits for construction industries.

However, even though a large academic production illustrates the potential of Construction and Demolition Waste (CDW) by providing simulations, life cycle analysis, and mathematical models, and holds with the new directives most of the construction companies are not yet achieving the expected level of reuse or recycle. In particular, the potential of Renovation and Demolition Waste (RDW) is far from been realized (Jin *et al.*, 2019). Studies have identified a number of barriers to explain this situation, beside the low quality of CDW material: Lack of interest and demand from clients; negative attitudes towards reuse practices; lack of training (Park and Tucker, 2017), contract forms, lack of space and information on site (Sezer, 2015), or different valuation practices (Bosch-Sijtsema and Buser, 2017). To overcome these barriers, the majority of the papers insist on ensuring that the construction actors comply with the guidelines and implement the strategies to recycle waste construction materials (Wu *et al.*, 2017), or that these policies and guidelines should be optimized and reinforced (Bosch-Sijtsema and Buser, 2017, Ajayi *et al.*, 2017, Wu *et al.*, 2017).

However, the scholars within sustainable transitions have shown that governmental, national and local legislations and incentives are not enough to ensure the application of new directives but require a transformation of the existing and often taken for granted established way of working (Grin *et al.*, 2010). So, to look at how the established way of working in RDW management (RDWM) can be transformed in order to adopt more sustainable practices, we build on the concept of institutional work. This enables us to get insights into micro-dynamics of institutionalization to discuss some of the challenges of renovation waste management and inform on the lack of generalised processes. In this paper we focus on the demolition companies and their role RDWM process. We are interested in identifying in their discourse which aspects are mobilized to account for the stability of the actual practices and may constitute barriers to the implementation of changes; which aspects are indicating a possible transformation or creation of new practices; and which ones may constitute as disruption of the actual practices.

Whereas the contractor role is often seen as central in this discussion (Alzahrani and Emsley, 2013), we choose to move our focus to the demolition companies and the role they play in RDWM. These companies though often in charge of the deconstruction and demolition of waste on site are often disregarded in the discussion (Bosch-Sijtsema and Buser, 2017). However, their role become central, especially in a Swedish context, as they are not only organising and executing the work on site but commonly decide on what happens to the material afterwards.

Our premise for this paper is that there is an institution of RDWM in which a common understanding is shared of what the formal and informal processes are as well as norms of conduct, contractual agreement and taken for granted behaviour and shape and are shaped by actor's behaviour (Hampel *et al.*, 2017).

After a presentation of the theoretical frame and the method, we present the outcome from the empirical material and a concluding analysis. The paper contributes to a better understanding to the barriers to improve RDW management practices but also identifies the possibility to change these practices for the construction sector to contribute substantially to the achievement of a sustainable agenda.

Theoretical Frame

To study the lack of efficient RDW Management under the new legislation frame, we adopt the lenses of institutional work as it enables us to study how actors rather “than accepting institutions as innately enduring and their effects as immutable, and to explore the practices and processes associated with actors’ endeavours to build up, tear down, elaborate, and contain institutions, as well as amplify or suppress their effects” (Hampel *et al.*, 2017, p.3). Here we define institutions according to Suddaby and Greenwood (2009, p. 176): ‘an institution may take the form of juridical regulations, informal rules or codified social arrangements, norms of conduct, or cognitive structures that provide understanding and give meaning to social arrangements’. According to (Greenwood *et al.*, 2008, p.4-5) institutions can be described as ‘more or less taken-for granted repetitive social behaviour that is underpinned by normative systems and cognitive understandings that give meaning to social exchange and thus enable self-reproducing social order’. Institutions are socially constructed and maintained by human behaviour, thoughts and feelings and repeated both intentional and unintentionally. The actors of which institutions are built upon are portrayed to be regulated by the institutional structures they are a part of. At the same time capable to gather the necessary resources and awareness to perform work that affects the institutional arrangements (Hampel *et al.*, 2017).

In its original definition, institutional work is defined as “the purposive action of individuals and organizations aimed at creating, maintaining and disrupting institutions” (Lawrence and Suddaby, 2006, p.215) and highlights the how, why and when of this action taking place (Lawrence *et al.*, 2011). Individuals are described as capable beings that both intentionally or unintentionally influence their institutional setting through their behaviour, thoughts and feelings and puts focus on the actor's role in the tension between continuity and change in institutional work (Hampel *et al.*, 2017). These actions may be very dramatic and highly visible or just mundane and hardly noticeable events that are integrated in the daily routines of actors (Lawrence *et al.*, 2009). It illustrates actors as capable to resist changes and that it isn’t enough to introduce new innovations or practices, but that it is also necessary to affect the opinions and habits of the ones who are part of the institutional setting (Patterson and Beunen, 2019). Though the focus of institutional work is practice, it has also been influenced by the 'linguistic turn', discourse and narratives are also adopted to study this process (Zilber, 2009). Scholars have shown that actors employ discourse and narratives in different ways to pursue what they call symbolic institutional work (Hampel *et al.*, 2017). These discourses can be mobilised to explicate situations, justify actors and defend course of actions by a selection, combination and editing of events or arguments (Zilber, 2009).

Whereas institutional work has been largely mobilised in many fields the last 20 years, it has made a late entrance in Construction management (Bresnen, 2017, Chan, 2018). Institutional work in construction management literature has focused among others on environmental expertise (Gluch and Bosch-Sijtsema, 2016), design-build management (Urup, 2016), public facility management (Gluch and Svensson, 2018) and inter-organizational projects (Liefstink *et al.*, 2019).

METHOD

The paper presents the preliminary results of an ongoing PhD (2018 -2023) which aim is to document and analyse the management, organisation and practices of RDW in construction and whereas these related practices are converging or not with new

public regulations and sustainable goals. Building on an interpretative approach, it draws on material collected in an ongoing project (2017-2019, Buser and Bosch-Sijtsema, 2018) and the mentioned PhD. The project adopts the lenses of institutional theory, in particular institutional work, to discuss the empirical material.

A starting point to identify the actual practices is to observe how RDW work is performed, therefore participant observation will be mobilized as a main method further in the project. But for the present paper we built on three renovation site visits; two to the same site with six months interval and interviews of the main actors engaged in construction renovation. In addition, we also attended a three-hour workshop organized by a professional association on the topic of circular economy and waste in the construction sector, gathering 22 practitioners. The site visits, which took around two hours were documented with notes and pictures and some discussions were also recorded. The list of 23 interviewees, presented in table 1, consists of actors engaged in renovation waste management. We have gathered their experiences and opinions regarding the actual practices of handling waste management from the perspective of the demolition companies. We have carried out 18 interviews including six demolition companies, four contractors, two clients, one professional association representative, two municipality offices active in environmental protection and one large recycling companies in the region.

Table 1: List of the people involved in the data collection

Organisation	Interviews	Interviewees	Positions
Contractors	4	4	Project manager, site manager, production manager
Demolitions small - medium contractors	5	9	Project manager, site manager, production manager, sustainability manager
Large contractor subsidiary	2	3	Business developer manager
Recycling contractor	2	1	Business developer manager
Municipality (Gothenburg)	2	3	Environmental supervision unit
Construction Industry association	1	1	Officer in charge of WM
Clients/FM	2	2	Project managers
Total	18	23	

Data collection

The 18 semi-structured interviews were performed between 2017 and spring of 2019. They took place either at the interviewees' office in the company or at the construction site. The duration of these interviews ranged from forty-five minutes up to one and a half hour and 13 of 16 were conducted by two researchers. On four occasions, they were performed as group interviews with more than one representative of the companies. All the interviews were recorded and transcribed, before being transferred and analysed in NVivo according to the themes we developed in iteration with the theoretical framework on institutional work and the waste management literature. All participants were informed about the goal of the study and that their contribution is anonymous.

Besides, we have collected numerous written documents including professional guidelines, norms and certifications, companies' websites, renovation projects and quality control protocols, waste material descriptions, price lists and price calculations, and national and European governmental reports.

Empirical Material

Discourse as a maintenance strategy

In the way the interviewees talk about their professional activities, they mobilize a large number of similar elements to justify the actual practices and prevent the possibility to change. Here we list some of the main arguments:

The conservative reputation of the sector is still ranking high to account for the resistance to new practices. “- You must’ve heard about the 11th commandment in the construction sector? - That is? - This is the way we’ve always done it! - Followed by the 12th; We’ve never done it like that before!” (Officer in charge of waste management).

Another reoccurring argument in preventing improvement in sorting is the lack of space on site, especially within the urban city centre.

The central role of time and cost are mentioned by all the interviewees as the main barrier for adopting more rigorous waste management practices.

The work division between the different actors enables them to attribute the responsibility of taking initiative to improve RDWM to each other, i.e., the contractor blames the client and the subcontractor blames the contractor and so on.

They also blame the legislations for having too high demands in term of quality to enable the reuse of waste materials.

The demolition companies insist on the lack of clear demands regarding waste management, “In any formal document you send, no one will read the parts concerning waste and environment. You can include in the writing that: To whomever reads this, I will give you a cake, if you call this number. Nobody ever rings. That’s the way it is, they never check that part.” (SME Demolition contractor). A similar argument is mobilized for the work on site and the lack of interest for the waste as such; the contractors assess the quality of the demolition companies work, they claim, by the dismantling and cleaning of the facilities and not by the quality and quantity of the waste and what happens to it afterwards. Most of them also repeat that the selling of the waste is a side activity generating very low revenue and don’t see a market potential for it.

Those arguments clearly identified in the interviews, were reflexively repeated during the workshop. Whenever solutions were proposed to improve the waste management processes, the demolition companies immediately reacted by mentioning one of these arguments to oppose the solution concluding with a: “all these sounds good but I have a business to run” (Demolition company manager).

Creating waste management institutions

The following section build mainly on two demolition companies that advocate for creation and one demolition company that demonstrates disruptive behaviour of the actual RDWM institution. However, we should not take for granted that the positions are clearly divided between actors.

In the most active company, the supporter of changes builds on the relabelling of the usual WM terms: “we do not demolish but deconstruct”, material produced in WM is renamed product or resource “as by calling it waste, we’ve already accepted it as waste”. Likewise, “the end of life understanding of WM” is substituted with a profit of a life cycle understanding where being waste is only viewed as a state in a non-ending transformation.

The actors of the three companies also insist on their responsibility as change agent and the necessity for all actors in the sector to question the current way of working as well as the distribution of tasks between the partners.

Most of the companies' part of our studies have invest in new low energy machines, equipment and vehicles or borrow specific machine instead of buying them.

Two of the front runner demolition companies have added sustainable WM as an integral part of the strategic agenda and incorporate sustainability information on different levels of the organization through forums and employee meetings.

These companies also offer WM training. They educate their own employees to more efficient and milieu friendly waste handling including health and safety, use of equipment and machines and organisation of transport. They offer similar programme to their customers selling their expertise as to create value for their customers.

They also network and actively contribute to trade conferences and seminars on the topic, presenting their new business model and best practices.

One of the companies for example is collecting waste from both its own and other companies' projects which are then sell further. This is perceived as positive for other companies as it reduces the cost for waste handling and offers the customer lower purchase costs for reused material and may even increase their revenue

Disrupting Waste Management

We find only one company which behaviour can be associated to disruption. This company, a subsidiary of one of the large contractors in Sweden, provides materials and services to the construction and civil engineering industry. The offer includes concrete, gravel and rock crushing, transport and construction machinery as well as environmental services such as recycling, land remediation and water treatment. They oppose clearly to the actual practices of collecting the different fractions on site but propose to collect material according to its reuse potential and the quantity produced. In doing so, they claim that material with a high recycling potential would be prioritised and its quality preserved. To focus on the quantity of material instead of putting an equal effort into all the different waste types, would optimised the recycling possibility and constitute a viable business model. But this necessitates that the construction companies themselves take charge of the material and can assess and 'ensure' the quality of their material. One of the demolition companies is using the example that they collect the waste, tests it, and if there isn't an issue, they resell it as construction material to other companies and avoid the additional waste handling fees for landfill material.

ANALYSIS

The following section analyses the empirical material according to the different forms of institutional work to maintain, create or disrupt the existing RDWM institution.

The maintenance category is presented in our material so far mainly through symbolic institutional work and the use of discourse to maintain the actual situation (Hampel *et al.*, 2017). The conservative actors are repeating the usual and taken for granted assertions about the construction sector and waste management: The sector cannot change, time and money rule, there is no space on site and no interest for the material produced. Their discourse contributes to maintain of the current institutions by defining the accepted structures, practices and beliefs. In mobilising the usual barriers, they argue for a generic understanding of the actual practices. The sector is

presented as one and indivisible, where contextualised solutions are not valued (Zilber, 2008). Building on these assertions, their position prevents any kind of new developments and may even describe the proposals for development as threatening their actual business, demonising the possibility of change (Lawrence and Suddaby, 2006).

Though these actors attend seminars and workshops, their attitude is critical towards ideas of new forms of practices and they often voice resistance. Nonetheless, they do recognise the necessity to adapt RDWM to the new sustainability demands but expect changes to be organised by other actors such as the state and municipalities and supported by new legislation.

The institutional work of actors in maintaining the current practices within the sector may not appear as explicit as of those trying to impose change. However, the daily work performed by these companies reinforces the actual practices and routines and reproducing continuously the current RDWM institution, their actions being intentional or not (Lawrence *et al.*, 2009).

There are a few actors performing creation work by offering new solutions and practices aligned with the current assumptions expressed in the industry guidelines and recommendations to achieve sustainability goals. Symbolic institutional work is mobilised when we see the actors renaming objects and processes. By developing a competitive labelling, the actors claim a new identity for RDWM enabling to change the perception and accordingly the practices (Hampel *et al.*, 2017).

The creation supporters actively engage in network of interests to share and diffuse their ideas, they participate in professional workshops and seminars and use professional media to share and legitimize their approach building on their own practices (Lawrence and Suddaby, 2006). In doing so, they participate to the spreading and normalisation of the new RDWM conceptualisation and practices. They also offer training in skills and knowledge necessary to support the establishment of the new institution (Lawrence and Suddaby, 2006).

Under the category disruption, we find arguments criticising and dismissing both the creation and maintenance strategy (Lawrence and Suddaby, 2006). This position rejects both the current RDWM institutions and the arguments for the new model. This company's discourse undermines both models by underlining the lack of financial viability of the existing institution and well as the new proposal. Building on a market logic where profitability is the only driver, the company proposes to redistribute the tasks and create new business models. They promote a type of change that goes beyond simply enforcing the current rules and instead questions the general perception and goals that are defined. Having developed one of the only successful construction recycling loops in Sweden, they participate in workshops, seminars and multidisciplinary research projects to share their views.

CONCLUSION

As a first step of research we have used the theory of institutional work and in particular the concept of creation, maintenance and disruption to identify actions mobilized in demolition company to account for the stability of the actual practices and may constitute barriers to the implementation of changes; as well as the ones indicating a possible creation of new practices or even disruption. Our study underlines that institutional work is performed using similar forms under the three

processes, however creation and disruption have in common the necessity of destabilising the existing institution to enable the creation of new ones.

Under the category maintenance we've gathered the 'status quo' arguments which repeat the commonly identified barriers. These barriers prevent any possibility of change and reproduce the actual institution.

Arguments are gathered under the creation section that are advocating for changes in practices that are aligned with the guidelines and the circular economy principles. They share the assumption that the implementation of those principles can be achieved.

Under the category disruption, we find the arguments criticising and dismissing both the creation and maintenance strategy. Here we find a position rejecting the creation and maintenance assumptions and propose to develop another paradigm to rethink how the RDWM can achieve sustainability.

The construction sector needs to take its responsibility to achieve the goal of the sustainable agenda. Our next step is to study what the actors do in their daily activities to shape their institutional context.

REFERENCES

- Alzahrani, J I and Emsley, M W (2013) The impact of contractors' attributes on construction project success: A post construction evaluation, *International Journal of Project Management*, 31(2), 313-322.
- Ajayi, S O, Oyedele, L O, Bilal, M, Akinade, O O, Alaka, H A and Owolabi, H A (2017) Critical management practices influencing on-site waste minimization in construction projects, *Waste Management*, 59, 330-339.
- Ajayi, S O, Oyedele, L O, Bilal, M, Akinade, O O, Alaka, H A, Owolabi, H A and Kadiri, K O (2015) Waste effectiveness of the construction industry: Understanding the impediments and requisites for improvements, *Resources, Conservation and Recycling*, 102, 101-112.
- Bosch-Sijtsema, P and Buser, M (2017) Construction and demolition waste management on the building site: A literature review, *In: Chan, P W and Neilson, C J (Eds) Proceeding of the 33rd Annual ARCOM Conference, 4-6 September 2017*, Cambridge, UK, Association of Researchers in Construction Management, 269-278.
- Buser, M and Bosch-Sijtsema, P (2018) Attributing value to waste: The difficult road to efficient waste management for renovation projects, *In: Gorse, C and Neilson, C J (Eds.), Proceedings 34th Annual ARCOM Conference, 3-5 September 2018*, Queen's University, Belfast, UK Association of Researchers in Construction Management, 119-128.
- Bresnen, M (2017) Being careful what we wish for? Challenges and opportunities afforded through engagement with business and management research, *Construction Management and Economics*, 35(1/2), 24-34.
- Chan, P (2018) Change and continuity: What can construction tell us about institutional theory? *In: D J Sage and C Vitry (Eds.) Societies Under Construction: Geographies, Sociologies and Histories of Building*. Cham: Springer International Publishing.
- European Commission (2016) *Construction and Demolition Waste Management in Sweden*. Available from http://ec.europa.eu/growth/content/eu-construction-and-demolitionwaste-protocol-0_en [Accessed 2nd September 2015].

- Gluch, P and Bosch-Sijtsema, P (2016) Conceptualizing environmental expertise through the lens of institutional work, *Construction Management and Economics*, 34(7/8), 522-535.
- Gluch, P and Svensson, I (2018) On the nexus of changing public facilities management practices: Purposive and co-creative actions across multiple levels, *Construction Management and Economics*, 36(5), 259-275.
- Greenwood, R, Oliver, C, Suddaby, R and Sahlin-Andersson, K (2008) Introduction to the Sage handbook of organizational institutionalism, *In: R Greenwood, C Oliver, K Sahlin and R Suddaby (Eds.) The SAGE Handbook of Organizational Institutionalism*. London: Sage publications.
- Grin, J, Rotmans, J and Schot, J (2010) *Transitions to Sustainable Development: New Directions in the Study of Long-Term Transformative Change*. New York: Routledge.
- Hampel, C E, Lawrence, T B, Tracey, P, Greenwood, R and Oliver, C (2017) Institutional work: Taking stock and making it matter, *In: R Greenwood, C Oliver and T B Lawrence (Eds.) The Sage Handbook of Organizational Institutionalism*. London: Sage Publications.
- Hardie, M, Miller, G and Khan, S (2011) Waste minimisation in office refurbishment projects: An Australian perspective, *Open Waste Management Journal*, 4, 21-27.
- Jin, R, Yuan, H and Chen, Q (2019) Science mapping approach to assisting the review of construction and demolition waste management research published between 2009 and 2018, *Resources, Conservation and Recycling*, 140, 175-188.
- Lawrence, T B, Suddaby, R and Leca, B (2011) Institutional work: Refocusing institutional studies of organization, *Journal of Management Inquiry*, 20(1), 52-58.
- Lawrence, T B and Suddaby, R (2006) Institutions and institutional work, *In: S R Clegg, C Hardy, T B Lawrence and W R Nord (Eds.) Sage Handbook of Organization Studies, 2nd Edition*. London: Sage, 215-254.
- Lawrence, T B, Suddaby, R and Leca, B (2009) Introduction: Theorizing and studying institutional work, *In: B Leca, R Suddaby and T B Lawrence (Eds.) Institutional Work: Actors and Agency in Institutional Studies of Organizations*. Cambridge: Cambridge University Press.
- Li, M and Yang, J (2014) Analysis of interrelationships between critical waste factors in office building retrofit projects using interpretive structural modelling, *International Journal of Construction Management*, 14(1), 15-27.
- Lieftink, B, Smits, A and Lauche, K (2019) Dual dynamics: Project-based institutional work and subfield differences in the Dutch construction industry, *International Journal of Project Management*, 37, 269-282.
- Lu, W and Yuan, H (2011) A framework for understanding waste management studies in construction, *Waste Management*, 31(6), 1252-1260.
- Micelotta, E R and Washington, M (2013) Institutions and maintenance: The repair work of Italian professions, *Organization Studies*, 34(8), 1137-1170.
- Park, J and Tucker, R (2017) Overcoming barriers to the reuse of construction waste material in Australia: A review of the literature, *International Journal of Construction Management*, 17, 228-237.
- Patterson, J J and Beunen, R (2019) Institutional work in environmental governance, *Journal of Environmental Planning and Management*, 62(1), 1-11.
- Sezer, A A (2017) Factors influencing building refurbishment site managers' waste management efforts, *Journal of Facilities Management*, 15(4), 318-334.

- Suddaby, R and Greenwood, R (2009) Methodological issues in researching institutional change *In: Buchanan, D and Bryman, A (Eds.), The SAGE Handbook of Organizational Research Methods*. London: Sage Publications, 177-195.
- Udawatta, N, Zuo, J, Chiveralls, K and Zillante, G (2015) Improving waste management in construction projects: An Australian study, *Resources, Conservation and Recycling*, 101, 73-83.
- Urup, L (2016) *Integrated Design-Build Management: Studying Institutional Processes to Understand Project Coordination and Performance*, PhD thesis, Department of architecture and civil engineering, Chalmers University of Technology.
- Wu, Z, Ann, T and Shen, L (2017) Investigating the determinants of contractor's construction and demolition waste management behaviour in Mainland China, *Waste Management*, 60, 290-300.
- Zilber, T B (2008) The work of meaning in institutional processes, *In: R Greenwood, C Oliver, K Sahlin and R Suddaby (Eds.) Handbook of Organizational Institutionalism*, London: Sage, 150-169.
- Zilber, T B (2009) Institutional maintenance as narrative acts, *In: T B Lawrence, R Suddaby and B Leca (Eds.) Institutional Work: Actors and Agency in Institutional Studies of Organizations*. Cambridge: Cambridge University Press, 205-235.