Creating a tiny home building code to positively affect long-term sustainability

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Abstract. There is an ongoing effort in the tiny home construction industry in the United States to create a tiny home specific building code. To date, there has been little data collected to reflect how the creation of a building code could affect the tiny home industry. Mixed methods research was conducted, utilizing both quantitative and qualitative data. Interviews were conducted with tiny home experts, builders, owners, advocates, insurers, financers, and building officials. The results of the research indicated that creating a tiny home building code would positively affect the sustainability of the tiny home movement. Of the different types of tiny homes identified in the research, those associated with tiny homes on wheels (THOW) would likely benefit the most from a creation of a tiny home specific building code. The majority of those surveyed (76%) were in support of creating a THOW specific building code. Five main categories were identified as necessary for inclusion in a THOW specific building code including trailer foundations, trailer to structure connections, framing, electrical, and sanitation. Eleven subcategories, or specific items, were identified as essential for inclusion in a THOW specific building code. Future research should validate the data collected and ensure all pertinent code items are addressed.

1. Introduction and background
The tiny home movement has gained notoriety in the United States over the last several years due to increased publicity of the lifestyle through television programs, internet blogs, and other forms of social media. Tiny homes generally range in size from 60 to 400 square feet with most near the 200 square foot mark [1]. Tiny homes offer the potential for increased financial freedom. The cost of living in the United States doubled between 1992 and 2017 [2]. This sharp increase (145%) in cost of living makes tiny homes an attractive housing option for many people. One study found that an unaffordable housing market in the U.S. ignited new housing choices, potentially altering housing trajectories in the future [3]. Additionally, the U.S. Department of Housing and Urban Development (HUD) reported that 580,466 people experienced homelessness in the United States on a single night in 2020, an increase of 12,751 people, or 2.2 percent, from 2019 [4]. With the rising cost of living and rising rate of homelessness in the U.S., tiny homes offer a potential solution worth exploring.

Many subcategories of tiny homes exist. Though the following list is not all-inclusive, most tiny homes fall into one of the following five categories: tiny house on foundations (THOF), accessory dwelling units (ADU), tiny house on wheels (THOW), park model recreational vehicles (PMRV), and recreational vehicles (RV). The research presented herein focused on tiny homes on wheels (THOW). Advocacy groups supporting these various types of tiny homes have been formed in recent years to help advance and promote the tiny home movement. The goal of the American Tiny House Association...
(ATHA) is to is to support tiny house enthusiasts who are seeking creative and affordable housing as part of a more sustainable and self-reliant lifestyle [5]. The Tiny Home Industry Association (THIA) is a non-profit organization on a mission to advocate for regulation changes, develop standards, and promote best practices in the construction, placement, and widespread use of tiny homes as permissible and permanent housing [6]. Other formal groups and individuals have advocated for the advancement of the tiny home movement in recent years. These advocacy groups offer a pool of individuals who are well aware of the challenges that exist within the tiny home movement, even those that may not be well known among the general population.

Several known barriers to the tiny home movement exist, making it difficult for some to build or purchase a tiny home. State and local governments have resisted the tiny home movement due to lack of regulations. One study identified lifestyle, land, financing, and classification as early barriers to the tiny home movement [7]. This study recommended that future research should include interviewing building officials, builders, and others to close the gap between building code and uncovering solutions for tiny home owners acquiring land, solutions to standardize building codes for tiny homes and even serve as education on the tiny home movement [7]. Another study concluded the two greatest barriers to tiny homes are building codes and zoning ordinances that treat them as illegal or illegitimate types of housing [8]. As noted in another article, tiny homes fall between cracks in the current building code [9]. The aforementioned barriers has also made it difficult for some to procure insurance for a tiny home [10]. A standardized building code could help support legalization of tiny homes as a form of long term housing. To date, there has been little data collected to reflect how the creation of a building code could affect those involved with tiny homes including builders, owners, insurance agents, financial partners, and others. Additionally, little research has been done to identify specific areas of building code which need to be written or specified for tiny homes.

Tiny homes offer one potential solution to rising home prices and the increased rate of homelessness in the U.S. today. The tiny home movement includes several subtypes of tiny homes that have garnered support from various advocacy groups. The movement has also seen adversity, with various barriers to tiny home ownership. Previous research has identified several known barriers to the tiny home movement, one of which is the lack of related building code [7], [8]. The research presented herein sought to determine whether a tiny home specific building code would be positive for the movement and identify specific areas of building code to be included.

2. Methodology
Mixed methods research was utilized to complete this study. Qualitative research was conducted by interviewing industry professionals, groups, and associated trade professionals including insurance and financing companies. These interviews were conducted via phone and engaged tiny home builders, developers, social media advocates, designers, and owners across the country. Each interview took approximately one hour to complete. Interviewees were asked a series of questions that required open-ended discussion. The questions included background about the individual, their position on current and future building regulations, their thoughts on current inspection services for tiny homes, and how financing and insurance for tiny homes had affected their business. Notes were taken during all phone interviews and answers to the interview questions were compared and analysed to find trends or distinctions among answers.

The initial interviews described above helped refine a standard set of eleven survey questions which were distributed to builders associated with the tiny home movement. This survey is herein referred to as Survey 1. Qualtrics survey software was used to collect and process the survey data. The tiny home builder survey focused primarily on the five categories of code issues frequently mentioned during the initial interviews. Builders of varying experience and involvement were invited to participate in this survey. This survey was disseminated as widely as possible through email and social media.

After analysing the data collected from Survey 1, and comparing it to the qualitative data collected during the interviews, the survey was then updated and expanded for use as a quantitative means of data collection. A new survey was then created in Qualtrics that consisted of 24 questions including multiple
choice, ranking, multiple answer, and fill-in-the-blank. This survey is herein referred to as Survey 2 and was open to all members of the tiny home movement. Links to Survey 2 were distributed via email and social media and respondents were encouraged to share the link with others. Upon closure of the survey the data was analysed using Qualtrics reporting software.

3. Results and discussion
As previously mentioned, the research was conducted in 3 parts. First, qualitative data was gathered through phone interviews with tiny home designers, builders, owners, and advocates to develop a set of survey questions for Survey 1. Survey 1 was sent to 11 tiny home builders to further refine and validate the survey questions. The refined survey, Survey 2, was open to anyone associated with the tiny home movement and was disseminated as widely as possible through email and social media.

3.1. Interviews
A total of 14 interviews were conducted including 8 professional tiny home builders, 2 do-it-yourself builders, 1 tiny home insurance agent, and 3 tiny home advocates. After completing all 14 interviews, the notes taken during the process were reviewed and a common trend was discovered among tiny home builders. Of the 10 builders interviewed, all of them shared the same opinion that a building code or standard needed to be written for tiny homes to further the advancement of the tiny home movement. Furthermore, when asked if there were specific code concerns, interviewees focused on five categories of code compliance issues: trailer foundations, trailer to structure connections, framing, electrical, and sanitation. These five categories of code compliance formed the basis of the Survey 1 which was distributed to tiny home builders. Additionally, the initial interviewees commonly stated that tiny homes on wheels (THOWs) were the most unique brand of tiny homes and currently most in need of a common code. Therefore, the remainder of the research focused solely on THOWs.

3.2. Survey 1
As previously mentioned, a builder specific survey was created based on results from the initial interviews. The survey questions themselves are excluded from this paper for brevity. The survey included both pre-determined and open-ended questions which focused primarily on the 5 categories of code issues identified during the initial interviews. These categories included trailer foundations, trailer to structure connections, framing, electrical and sanitation. The results of Survey 1 questions revealed subcategories, representing more specific areas of deficiencies in current building code as it relates to THOWs, within each of the five main categories. As shown in Figure 1, eleven total sub-categories representing deficiencies within current building code were identified by the survey respondents.
Based on the extent of the perceived lack of clarity in current building codes, which do not specifically address some of the unique features of tiny homes, the creation of a tiny-home specific building code could prove beneficial by improving safety, quality, and consistency of tiny home construction while providing much needed guidance to builders. This type of code could benefit both professional and DIY tiny home builders.

3.3. Survey 2

Survey 2 was available for all members and supporters of the tiny home movement. The purpose of Survey 2 was to substantiate the findings from Survey 1 while also comparing perceptions between builders, developers, potential and current owners. When considering the development of a tiny home specific building code, the concerns of all stakeholders should be taken into account, including consumers, suppliers, financers, and potentially others.

Questions 1-4 were intended to classify the respondent based on experience and location. Questions 5-6 were used to further qualify the experience of builders while questions 7-8 were meant for tiny home owners. Questions 9-12 were used to assess the availability of and/or the need for both insurance and financing for tiny homes. Questions 13-18 related to specific building inspection services and codes, while questions 19-23 focused on the top five general areas of code deficiency found during the interviews and substantiated by Survey 1.

Survey 2 was conducted over the course of two months and amassed 72 responses. Question 1 responses were recorded as follows: 16 owners, 26 potential owners, 6 advocates, 16 builders, 2 business entities, and 6 who identified as “other.” Question 2 responses were as follows: 18 respondents had been involved with the tiny home movement for 1 year or less, 28 respondents for 2-3 years, 12 respondents for 4-5 years, 9 respondents for 6-9 years, and 5 respondents for 10 or more years. Question 3 results indicated that 21 survey respondents chose to “go tiny” for financial freedom, 16 for both financial freedom and lifestyle changes, and 9 for “other” reasons. Upon further analysis, the owners and potential owners accounted for the majority of the responses for both financial freedom and lifestyle changes. Builders accounted for the majority of the business opportunity responses. In response to question 4, 22 respondents were located in the Southwest, 20 in the Southeast, 15 in the Northeast, 7 in the Northwest, 7 in the Midwest, and 1 on the West Coast. This indicated a good geographical amongst those who completed the survey. In response to question 5, 10 builders completed at least 1 tiny home,
8 builders completed 21 or more tiny homes, 4 completed 2-3 tiny homes, 3 completed 4-5 tiny homes, 2 completed 16-20 tiny homes, and 1 completed 6-10 tiny homes.

In response to question 9, 16 of 29 respondents stated that they did have insurance on their tiny home. The 16 responses claiming to have insurance were then asked to identify what type of insurance they had. Of the 11 responses recorded listing the type of insurance, 6 of the answers identified RV insurance as the policy type. Additional answers were area specific or different types of tiny home specific insurance such as homeowner’s insurance on a THOF. In response to question 10, 5 out of 21 answered “yes” to having financing for their tiny home. Of the financing type recorded, RV financing was the most common answer. This finding supports the idea that financing is an underlying issue within the tiny home movement. Although insurance has become readily available for tiny home owners, financing has yet to offer options to the movement beyond small credit unions or personal equity companies.

To further identify how insurance and financing have impacted the tiny home movement, questions 11 and 12 posed a scenario about the impact on building or buying a tiny home if there were more readily-available options for insurance and financing, respectively. A resounding 50 of 72 “yes” responses were recorded for question 11 regarding insurance, while 13 responded “maybe,” and 9 responded “no.” Even more overwhelmingly, 52 of 72 responded “yes” to question 12 regarding financing, while there were 10 responses each for “maybe” and “no” for the same question.

Questions 15 asked if those surveyed are in favour of creating a uniform code for tiny homes on wheels (THOWs). The response to question 15 shows that 76% (55 of 72) of those surveyed are in favour of creating a THOW building code. With less than 7% of survey takers answering “No” to the question there was overwhelming support that a building code would be widely supported in the tiny home community. Similarly, question 16 asked if the respondent would be more likely to buy or build a THOW if a tiny home specific building code were created. Nearly 70% responded “yes” to this question while 22% said “maybe” and 8% “no.”

Question 17 provided interesting results. As shown in Figure 2, there were great inconsistencies in which building code those surveyed believed to be most applicable to THOWs. The results provided in this figure give credit to the postulation that the formation of a consistent standard could be beneficial for many reasons.

![Figure 2: Current building codes cited as most important for THOWs](image)

Questions 19-23 utilized a modified format of the builder survey (Survey 1) to pinpoint specific code issues perceived to be most important to respondents. These questions correspond to the perceived biggest issues/omissions in current code combinations, or lack thereof, for foundations, trailer-to-
structure connections, framing, sanitation, and electrical items and results are summarized in Table 1, below.

| Major Category       | Minor Category                             | Responses |
|----------------------|--------------------------------------------|-----------|
| Foundations          | Tie-Downs/Securing                         | 32        |
| Trailer-to-Structure | Metal to Wood Connections                   | 18        |
|                      | Spacing/Frequency of Connector             | 20        |
|                      | Type of Connector Used                     | 16        |
| Framing              | Use of Hurricane Straps                    | 23        |
|                      | Type of Members Used                       | 15        |
|                      | Energy Code Requirements                   | 11        |
| Sanitation           | Proper Disposal of Waste Removal           | 33        |
|                      | Composting Systems                         | 10        |
| Electrical           | Installation Qualifications                | 32        |
|                      | Wire Protection                            | 15        |

As shown in Table 1, there were several consistent responses noted within each of the 5 major categories of building code. For foundations, potential owners and builders accounted for the majority of the tie down/securing responses. There were three significant responses in the trailer to structure category including metal to wood connections, connector type, and spacing/frequency of connectors. These results indicate a significant need for specific code guidance in this category. When framing a THOW, the underlying assumption is that these homes must withstand large wind forces during tow. Therefore hurricane strapping and type of framing members used make sense in the context of a THOW. Energy code requirements was also a significant response in the framing category. Within the sanitation category, the common responses of proper disposal of waste removal and composting systems which makes sense in the context of a THOW. Respondents indicated that installer qualifications should be standardized and also listed wire protection as a deficiency in current code combinations.

4. Conclusions

Among those interviewed and surveyed for this research, there was positive support for the creation of a standard building code specific to tiny homes on wheels (THOWs) with over 76% (55 of 72) of those surveyed in favour of creating a THOW specific building code. Initial interviews led to selection of 5 overall categories of emphasis for a THOW building code, including trailer foundations, trailer to structure connections, framing, electrical, and sanitation. Two follow-on surveys identified 11 subcategories within each of the five main categories including the following: tie-downs/securing; metal to wood connections; spacing frequency of connector; type of connector used; use of hurricane straps; type of members used; energy code requirements; proper waste removal; composting systems; electrical installation qualifications; and wire protection. A THOW specific building code should focus, at a minimum, on these 11 items.

The creation of a building code of this type would remove much of the ambiguity from the THOW building process, thus leading to more standard design and construction procedures for this type of home. A THOW code also has the potential to facilitate legalization of THOWs as building officials would have a standard for inspection. This could ease the current difficulties some individuals have had obtaining financing and/or insurance.
Future research should seek to expand and validate the current data set and ensure all relevant items are included. Additionally, future research should document the creating and implementation of a THOW specific building code.

5. References

[1] Mitchell R 2020 How big can a tiny house be without breaking the law The Tiny Life https://thetinylife.com/tiny-house-dimensions-what-size-can-a-tiny-house-be-without-breaking-the-law/

[2] Consumer Pricing Index (CPI) 2018 https://www.statista.com/statistics/190974/unadjusted-consumer-price-index-of-all-urban-consumers-in-the-us-since-1992/

[3] Carras M 2019 Tiny house big impact?: an investigation into the rise of the tiny home lifestyle (THL) in the United States University of St Andrews thesis https://eds-a-ebscohost-com.spot.lib.auburn.edu/eds/detail/detail?v=6&sid=ad2fc231-d75c-42da-a55b-547d1bd46ebd%40sdc-v-sessmgr01&bdata=JnNpdGU9ZWARzLWxpdmc2NveGU9e2l0ZQ%3d%3d#AN=edsble.777301&db=edsble

[4] U.S. Department of Housing and Urban Development (HUD) 2021 Press release HUD No. 21-041 https://www.hud.gov/press/press_releases_media_advisories/hud_no_21_041

[5] ATHA American Tiny House Association https://americantinyhouseassociation.org/our-mission-2/

[6] THIA Tiny Home Industry Association https://tinyhomeindustryassociation.org/

[7] Simons A, Moore E, and Kramer S 2018 Barriers to the tiny house movement RICS Cobra London UK

[8] Brown E 2016 Overcoming the barriers to micro-housing: tiny houses, big potential University of Oregon graduate capstone http://hdl.handle.net/1794/19948

[9] Stanton T 2015 Timber trails Tiny house building codes http://www.timbertrails.tv/Tiny-House-Building-Codes

[10] Wells A 2017 Insurance Journal Tiny homes: how agents, insurers are helping to lay a foundation for a growing insurance market https://www.insurancejournal.com/magazines/mag-features/2017/03/06/442981.htm