

## **AC 2010-844: HOMEBREWING 101: A VITAL PART OF A CIVIL ENGINEERING PROGRAM!**

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# Homebrewing 101: A Vital Part of a Civil Engineering Program!

## Abstract

In this paper the author shares his experience over several years of teaching civil engineering students to brew beer. This fun exercise, named HB101 (Homebrewing 101) by the students, was initially designed solely as a fun social event, but has become a beneficial extracurricular teaching tool that adds value to the overall civil engineering program at the United States Military Academy at West Point. More importantly, however, it addresses a substantive national issue that also affects young engineers; abuse of alcohol. The author briefly discusses how the “course” came about, its set up, and how it applies engineering methods to this task and creates ties to some of the scientific and engineering concepts learned in other settings. The main emphasis of the paper is on the ways this course has become an important, yet informal, part of the CE program, however. The author seeks to answer the question: “Is proper use of alcohol a valid topic for instructing civil engineers, and if so, is HB101 an effective way to influence the attitudes of young civil engineers on the proper use of alcohol?” The paper reviews the critical literature on young adult drinking behavior, changing social behavior, and changing attitudes. Using this seemingly counterintuitive approach, the paper discusses how teaching students to brew beer is one way that may actually help combat this national issue, and possibly change drinking behavior, and in so doing helps to foster fulfillment of an important part of the ASCE Body of Knowledge, chiefly “Attitudes”. The author also uses current teaching research to show how this activity helps to foster greater learning in the more traditional parts of the civil engineering program by strengthening the students’ commitment to the program as well as improving the professors’ rapport with their students. Finally, through anecdotal evidence and student surveys the author shares data to point to the successes and actual achievement of these goals. While not actually advocating that teaching homebrewing become a required part of all civil engineering programs, the author does believe that there are valuable lessons that can be applied to all programs from this creative effort to further educate civil engineering students.

## Introduction

Since students have been brewing beer as a semi-formal part of the CE program at the United States Military Academy at West Point the school’s program has consistently been ranked #2 in the nation by US News & World Report, received ASCE’s 2009 Walter LeFerve Award, the ASCE Student Chapter has an unmatched consistent record of awards, and the school was recently selected as the top college by Forbes magazine. Is this record of success directly related to brewing beer with students? Probably not, but it obviously has not hurt the program and the author argues it addresses an important issue and does contribute to the program’s widely recognized success.

During the mid 1990s the author picked up a new hobby, brewing beer at home or “homebrewing.” Not surprisingly, word got out among his students of their professor’s hobby. Quite informally several students would come over to his home in the evenings, on nights when no assignments required immediate work of course, and learned to brew beer. Naturally, this activity had to be limited to those over 21 years of age. The next year the informal program grew in popularity and was tied into the ASCE Student Chapter’s end of the year celebration, where

the students brewed the beer and named each variety to reflect a part of their civil engineering education experience. After service at other locations (where how to brew sessions were also conducted), the author returned to teaching at West Point and the homebrewing sessions were started again midway through the 2004 academic year. Each year since that time, they have grown and become what the students refer to as “Homebrewing 101” (HB101). Along the way this very extracurricular program became more formalized and more an expected part of the ASCE Student Chapter’s activities. It became the sole, and expected, supplier of the beer for the end of the year final social for the chapter. It has also become more self sustaining when another brewing instructor joined the faculty, himself being a previous homebrewing student and ran the course while the author deployed to Afghanistan for a year. The author realized as it grew in attendance and popularity, it had the potential, and in fact was providing much more than just a fun break from studies. It provided another opportunity for students and faculty to interact outside the classroom, provided a venue for students to socialize with their civil engineering peers, many of whom they did not know, and provided an opportunity to discuss professional issues informally. In addition, it allowed the faculty, in a very “non-preachy” way, to model behavior and address a serious issue facing our students that could possibly affect their behavior. The author hopes to share his experience and some results of this effort to accomplish some of these goals through HB101.

## **The Problem**

The fact that many young adults abuse alcoholic beverages, and especially beer, is not recent news or surprising to most people, especially those who work at colleges or universities. Research has found that the “vast majority of college students drink alcohol, and over half can be classified as moderate or heavy drinkers.”<sup>1</sup> “High alcohol consumption has been linked to a range of adverse effects, including high blood pressure, heart disease, and cirrhosis of the liver.”<sup>2</sup> More disturbing is the prevalence of binge drinking (consuming five or more drinks in a row).<sup>2; 3</sup> “Research continually shows that people tend to drink the heaviest in their late teens and early to mid-twenties. Young adults are especially likely to binge drink and to drink heavily. According to NESARC [National Epidemiologic Survey on Alcohol and Related Conditions] data, about 46 percent of young adults (12.4 million) engaged in drinking that exceeded the recommended daily limits at least once in the past year, and 14.5 percent (3.9 million) had an average consumption that exceeded the recommended weekly limits.”<sup>4</sup> Sadly the results are predictable, numerous studies document that those who engage in heavy drinking, and in particular binge drinking, are seven to 10 times more likely than non-binge drinkers to engage in unsafe sexual practices, damage property, suffer an injury, become involved in violence, commit date rape, have academic problems, experience family conflict, and drive while drunk.<sup>1; 2; 5</sup> These facts clearly show that this is a serious national problem and one that we can reasonably say civil engineers are not immune to. The American Society of Civil Engineers’ Committee on Student Activities (CSA) had frequent discussions on this topic during the author’s tenure on the committee from 2004-2007. These discussions often focused on student and Younger Member interactions and a perception that ASCE Younger Member activities often revolve around alcohol and at times in an inappropriate manner. While ASCE Younger Member groups provide a valuable transition into the civil engineering profession and greatly contribute to a strong profession, alcohol related incidents or potentially harmful situations do occur. The fact that this issue is discussed regularly in itself points to the relevance this national issue has to civil engineers. The bottom

line remains “Alcohol use during adolescence and young adulthood remain a prominent public health problem in the United States”,<sup>3</sup> and is applicable to civil engineering students and young adults.

### **Importance to Civil Engineering Education**

In the most recent version (2008) of the ASCE’ Body of Knowledge they list Outcome 22 as Attitudes. “Attitudes are the ways one thinks and feels in response to a fact or situation. Attitudes reflect an individual’s values and world view and the way he or she perceives, interprets, and approaches surroundings and situations.”<sup>6</sup> It is further explained that during the undergraduate experience future engineers need to begin developing supportive attitudes, and that these attitudes will need to be modeled by those charged with their education, the staff and faculty. The aim being that students can model these supportive attitudes themselves upon graduation, or at least be aware of them.<sup>6</sup> The author feels that responsible social behavior fits into one of these professional attitudes. The disastrous effects of alcohol abuse on any career are well know, and sadly recorded almost daily in the media. Alcohol is also part of our culture as civil engineers. Often alcohol is part of professional conferences where most have a social hour or sponsored happy hours, they are often a part of the end of the work week tradition, a part of dinner meetings, and alcohol is normally a part of events celebrating milestones and successes. A civil engineer simply put will have to make decisions during his career, and make them often, about how he or she will handle alcohol. As civil engineering educators, we are charged with preparing our students to enter into the profession of civil engineering. The author contends that in addition to preparing them for the traditional demands of the profession, it is not inappropriate to try to prepare them to act responsibly with alcohol, and feels that is one aspect of the BOK’s Attitudes outcome, an outcome we are required to fulfill. If we accept the premise that this is an appropriate challenge, the question becomes how do we accomplish it? At West Point all students receive a couple hours worth of classes on proper social behavior and responsible use of alcohol, usually taught to small groups based on a some common plan of instruction, in addition to many formal and informal “reminders” to use alcohol responsibly. This approach is common throughout many universities and colleges. “Unfortunately, few interventions have a documented positive impact in changing college drinking behavior. In particular, commonly offered educational programs have little impact.”<sup>5</sup> Given this, we cannot assume that a common core alcohol education program will be sufficient, so a different approach is called for.

### **Research on Drinking Behavior**

Research can point to several conclusions about student and young adult drinking behavior that can help guide a course of action. “The transition to young adulthood is a critical sorting point in life, a time of important and lasting changes in functioning and adjustment.”<sup>7</sup> Drinking is just one aspect of behavior our students are sorting out. It is interesting to note that 71% of students overestimate the actual number of drinks they thought the average student consumed when they partied or socialized. More importantly these inaccurate perceptions could have an effect on their own drinking behavior.<sup>8</sup> It was also found that “frequent binge drinkers were more likely to have a positive attitude towards binge drinking, to perceive social pressure to engage in binge drinking, to believe that binge drinking leads to various positive consequences and to see many facilitators of binge drinking.”<sup>2</sup> Interestingly the research shows the other side of the coin to be

true as well; “young adults who have low perceptions of their peers’ weekly alcohol consumption consume less alcohol per week and are less likely to engage in binge drinking.”<sup>8</sup> The implications are clear, defining actual reality and accurate norms could be a key to moderating drinking behavior. Young adults are looking for norms and guide posts that define adulthood as they make this transition and they will be more likely to use these norms to guide their behavior. Because of this stage in life “general norms regarding drinking behavior among adults should influence newly transitioning adults to a much greater extent than others who have occupied an adult status for a longer period of time.”<sup>8</sup>

While commonly offered educational programs may have little effect, other data and studies have shown that brief interventions are effective in reducing alcohol and drug use. In a hopeful result, studies have shown that those “receiving a brief individual preventive intervention had significantly greater reductions in negative consequences that persisted over a 4-year period. Individual change analyses suggest that the dependence symptoms of those receiving the brief intervention are more likely to decrease and less likely to increase.”<sup>5</sup> In the college setting and often immediately after graduation binge drinking is very much a social behavior which is facilitated by their social environment. As a result effective interventions may be those that attempt to influence the context of drinking consumption by modifying perceived social norms concerning alcohol consumption. This can involve education programs modeling appropriate drinking behavior.<sup>2</sup>

One can also look at the reaction to or exhibited effects of drinking and the relationship to accepted standards. Societies’ norms and standards have long been thought to have a significant impact on exhibited drinking behavior. In his 1828 book, the *Anatomy of Drunkenness*, Robert MacNish stated:

When in the company of a superior whom we respect, or of a female in whose presence it would be indelicate to get intoxicated, a much greater portion of liquor may be withstood than in societies where no such restraints operate. The mind exercises considerable effect upon drunkenness, and may control it powerfully.<sup>9</sup>

More recently, MacAndrew and Edgerton (1969) found that “aggression and debauchery under alcohol were often displayed in aboriginal societies that condoned these behaviors, whereas restrained behavior under intoxicating doses of alcohol was typically displayed in societies that reinforced a norm of behavioral sobriety under alcohol.” MacAndrew and Edgerton attributed these different drunken behaviors to learning, arguing that members of a society conform to the standard of behavior under alcohol they have learned is appropriate for the situation.<sup>10</sup> Building on this idea Zack and Vogel-Sprott’s study took the hypothesis that learned standards of behavior in a drinking situation can determine behavior, not only when alcohol is taken but also when it is merely expected. Their studies confirmed the hypothesis and demonstrated that behavior attributed to the effect of alcohol may be due in part to the learned standard of appropriate behavior under alcohol for any given situation.<sup>10</sup> The implications of this suggest that learned standards of behavior under alcohol can be a determinant of actual behavior when consuming alcohol.

Behavioral theory can also be applied to drinking behavior. O’Callaghan, et al. demonstrated in their studies the importance of normative influences on drinking behavior, providing support to previous research on the influence of peers and parents on drug use. Importantly their work also

pointed out that the opinions of other important individuals were generally perceived by these young drinkers to be favorable with regard to their alcohol consumption.<sup>11</sup> Because young adults are defining their role and image in their new profession and career, as well as their own self image, they may be more likely to aspire to (and also want to “match”) certain professional or career images.<sup>12</sup> This has been shown to be important in behavior prediction concerning alcohol use, having a favorable image increases the likelihood that the behavior will be performed.<sup>12</sup> Schulenberg, et al. found that with a group that was at high risk for continued frequent binge drinking and who had decreased their frequent binge drinking over time, several factors that were tied to their sense of a future self image were key. For this group, the factors that seemed to head off a long-term pattern of problem drinking included a higher internal control orientation, combined with a sense of dissatisfaction with their current social situation, and a sense of connection to how they viewed their future roles.<sup>7</sup> All of these studies point to the positive role that establishing a professional image and norms for students to aspire to play in establishing acceptable drinking behavior by young adults.

### **HB101: The Course**

The research on drinking behavior clearly indicates or implies there are ways to achieve positive changes in what is often unacceptable drinking behavior by students and young adults. The author noted that many of these ways of positively influencing drinking behavior were actually taking place during the “purely fun” and “non-educational” homebrewing sessions, possibly without student knowledge. Soon others became aware of the program and it became a featured and touted part of the program, even to the extent of being presented to the Dean as part of the department’s annual assessment presentation. The overwhelmingly positive response of others confirmed that something significant may be taking place and should be shared.

Several years ago one of the students wrote up a tongue in cheek course description worthy of the college catalog and sent it out to his classmates to solicit interest. From that time on, the HB101 course was an “official” part of the CE program at West Point.

*Hombrewing 101 (HB101) -This course will provide a life skill you can take with you for the rest of your life. The course will include both informational and laboratory portions. We will learn all about the different types of beers, histories and recipes. Then we will set out to brew our own in the lab. The course will culminate with a capstone social event in which we test the validity of our concoctions. Recent graduates of this course have all found full employment after graduation.*

At West Point each class section has a designated “section marcher” (the title is a throwback to the days when a class section was formed by the barracks and marched to their classroom). Today section marchers take attendance for the professor, circulate a time survey, and perform other minor administrative functions in the classroom. Each year HB101 solicits a volunteer to serve as the “section marcher”. This person serves as the link between the instructors and the senior class; he solicits interest and arranges small groups of two to five to attend a HB101 session when it is offered. The section marcher also keeps track of those who attend to ensure they receive a T-shirt, sticker for their hardhat, and graduation diploma at the end of the year (see figures 1, 2 and 3). It is interesting to note that all three items, the “diploma,” hardhat sticker,

and T-shirt, were added to the course based on student request and the hardhat sticker and T-shirt were a result of student designs. Again, the use of the section marcher and the desire to receive “credit” (diploma, sticker, and T-Shirt) just reinforces the “course” status of this activity.



Figure 1 Hard Hat Sticker



Figure 2 HB101 Diploma



Figure 3 HB101 T-Shirt Logo

A typical session lasts about two hours and is conducted in the homes of the instructors. The ideal group is 3-5 students. Four main activities take place during the evening. A brief lesson on beer, brewing, and the science of brewing is conducted; a beer is brewed; a variety of different beer types are sampled; and a meal is consumed. These four events are all conducted simultaneously for the most part. Initial discussion of the ingredients that make up beer and their role in the brewing process are gone over along with the chemical fermentation process. Tasting procedures are discussed and throughout the night students are provided small glasses of several varying types of beer to allow them to see differences and gain an appreciation for the variety of beer and the complexities of different tastes each style possesses. Some participants chose not to drink, whether they are the designated drivers or are non-drinkers, yet still come to enjoy the camaraderie of the experience and to learn about beer and brewing. One batch of beer is brewed and while it boils another batch from a previous group that has fermented is bottled (see Figure 4). During the evening bratwurst or pizza is traditionally served. Students are reintroduced to specific gravity, used to measure the amount of sugar in an unfermented beer and used as a measure to confirm fermentation has occurred, as well as other chemistry and engineering concepts (centrifugal force, pressure differential, siphoning, and fermentation as a few examples). Throughout the evening, although students may sample 6 varieties of beer, they usually only consume a total of approximately two 12 oz. bottles of beer or less. By engaging them with discussion and activity most are unaware how little they actually consume.





Figure 4 Students brewing during HB101 Session

Once the beer is brewed it is also named, often these names reflect common experiences the students have had in their civil engineering courses. An example, “Fire Station Red” was named to commemorate the capstone design project, designing a new campus fire station and “Wallkill Raspberry Wheat” was named in honor of the Hydro course rafting trip on the Wallkill River. Other names have capitalize on engineering concepts, “Poisson’s Porter—Good in Every Way” or “Direct Stiffness Stout—Strong Enough to make you a Flexible Member”. Some of the beer names have emphasized the common student experience; such as “Partial Credit Pilsner” and “Graduation Ale” among them. The naming of the beer does help our students and faculty work on their creativity (incidentally another BOK goal!), and provides a fun reminder of our common experience for any given class. Table 1 below is a listing of various beer names that have been associate with courses taught in the Department. The “final exam” for HB101 is the annual ASCE Student Chapter end of the year social, where all members of the faculty are invited along with our local ASCE section (see Figure 5). In addition to celebrating the end of another year and a class’s graduation, 8-12 different types of beer are available for sampling. One year at the request of two non- drinking students, we brewed root beer as well. The focus of the end of year event is not on drinking beer and students who are underage are invited and do participate. To insure that all rules prohibiting underage drinking are maintained, the students running the event check all participants and provide special “of age” wrist bracelets to all who are over 21, to include faculty and ASCE professional members in attendance (note the green wrist band on the student, on the far right of the right hand photo, in figure 5). This again models responsible use of alcohol, or non-use.



Figure 5 End of Year Celebration and “HB101 Final”

<u>Beer Name</u>	<u>Slogan</u>	<u>Associated Course(s)/Event</u>
Graduation Wheat Steel Head Beer Stone Pale Ale	<i>“A surprisingly good finish!”</i>	Graduation Steel Design Concrete Design, Wood & Masonry Design
Big Rock Twisted Pine Stout		Soils Mechanics of Materials, Wood & Masonry Design
Lazy Days Ale Poisson’s Porter Partial Credit Pilsner Direct Stiffness Lager	<i>“Good in EVERY way”</i> <i>“Just enough to get you through”</i> <i>“Strong enough to make you a flexible member”</i>	Graduation Structural Analysis All Structural Analysis
CPM Ale Sum of the Forces Ale Concrete Amber Analysis Ale Bent Rod Bitter Plasticity Porter Elasticity Ale Trail Blazer Brew Final Design Stout The End is Near Ale “Do it yourself” Ale Welder’s wheat	<i>“On the critical path to good taste”</i> <i>“A perfect balance”</i> <i>“A perfect mix”</i>  <i>“Better bent than broken”</i> <i>“Guaranteed to have lasting effects”</i> <i>“Will you yield?”</i> <i>“A brew to get you started”</i> <i>“The capstone of beers”</i>  <i>“Whatever you want it to be!”</i> <i>A beer to last through the moment</i>	Construction Management Statics Concrete Design Structural Analysis Mechanics of Materials Steel Design Statics, Structural Analysis Site Civil Capstone Course Capstone Course Independent Study Steel Design

Table 1 Beer Names

At West Point all the faculty, most of whom are also Army officers, takes our position as professional role models very seriously. HB101 provides an opportunity to model responsible social behavior that is expected of an army officer or a civil engineering professional. One unique aspect of West Point is that it is a highly controlled environment. Our graduates, newly commissioned 2<sup>nd</sup> Lieutenants, are given their first assignments and a new sense of freedom when they graduate. It is not uncommon that some try to make up for “lost time” and some do not know how, or just don’t, handle this new found freedom well, especially concerning alcohol. Given the importance of their career and their inevitable freedom from four years of tight control on their lives, proper social role modeling becomes critically important for our students. The HB101 sessions are hosted at professors’ homes, include a meal and provide a glimpse for

students of life after school that they can expect. With respect to alcohol, we also specifically want to model proper use of it and if possible affect current and future behavior of our students. “What a person expects from drinking not only predicts when he or she will begin drinking but also how much he or she will drink throughout young adulthood.”<sup>4</sup> Quite simply we hope to have a positive bearing on those expectations.

## Assessment

In an effort to assess the success of HB101, the author relies on both anecdotal evidence and a survey of past HB101 participants. Participation in HB101 varies from year to year, but ranges from 25% to 80% of CE majors in any given year participating. Over the years there have been several comments by students about the positive experience of HB101 in their end of program survey (a comprehensive survey given to graduating seniors at the end of their final semester). These comments come un-prompted and have always focused on the positive benefit of this activity to the program overall. In 2007 the ASCE Student Chapter’s annual T shirt had an exhaustive list of experiences and things to be remembered about the program. Number one on the list was “CE300-favorite course, **other than HB101**”. While these show that the students embraced HB101, not a huge surprise, they do not really indicate much other than an appreciation for the exercise.

There does exist a great deal of research that discusses what makes students successful in their college experience. Based on the review of 2600 empirical studies of college’s effects on students by Pascarella and Terenzini, “One of the most inescapable and unequivocal conclusions...is that the impact of college is largely determined by the involvement in both academic and nonacademic activities.”<sup>13</sup> Often as educators we focus on ensuring students are involved in the academic activities and leave the students to fend for themselves in terms of getting involved with nonacademic pursuits. However, these nonacademic activities provide us with another opportunity for teachable moments and another way to involve students that we should not ignore. HB101, a purely voluntary activity, both provides another way to involve students and another chance for student faculty interaction, especially out of class, which numerous studies have shown to also have a positive effect on all academic outcomes.<sup>14</sup> Not to be discounted, these brewing sessions provide numerous opportunities for frequent student interactions among other students which are also associated with “a pervasive pattern of positive benefits.”<sup>15</sup> Due to the HB101 connection with the ASCE Student Chapter, it serves as a way of highlighting the Chapter itself as an activity to be involved with and can serve as an entry vehicle for promoting the more traditional activities and associated benefits that the chapter brings to a program.<sup>16</sup> While all CE majors are members of the student chapter, and over 95% are national ASCE student members, participation at the events is completely dependent on student interest and motivation. “Frequent student faculty contact in and out of class is the most important factor in student motivation and involvement...Knowing a few faculty members well enhances students’ intellectual commitment and encourages them to think about their own values and future plans.”<sup>17</sup> HB101 is an activity that is truly suited to achieving these types of interactions.

During the winter months of the 2009 academic year a little over 100 former participants in HB101, all those who participated from the classes of 2004-2008, were e-mailed an invitation to fill out an on line survey. A link was provided to the survey, using SurveyMonkey.com to

collect data and administer the survey. The survey was completely voluntary and all responses were anonymous. No follow up request was ever sent. Sixty four responded to the survey. Attachment A is the message sent to former students and the survey questions. The results of this survey were quite positive and suggest that some measure of success has been achieved by HB101.

## Results

Not surprisingly, 92.2% strongly agreed that HB101 was enjoyable and they were glad that they participated; the other 7.8% just agreed that it was! More importantly, they valued their participation and the time spent, 100% agreed they learned something of value, and 76.6% of those “strongly agreed” that they did, indicating that this was more than just a fun social activity for them. More surprising was the fact that 100% thought of HB101 as a valuable part of the overall CE program, although not a CE course, and here again there was overwhelmingly strong agreement, 73.3%. As far as the goal of modeling responsible drinking behavior, only 3.1% were neutral to that being accomplished; 15.6% agreed and 81.3% strongly agreed that HB101 accomplished that goal.

In the open ended question about affecting their views on and consumption of beer, only 4.7% said it did not affect them (although this might not be negative, it is possibly this group could have had a very healthy view on the subject coming into the course), while 79.7% said it added to their appreciation of beer. Fourteen percent said they no longer viewed beer as a vehicle to get drunk, but something to be enjoyed. A few representative comments received in this vein included:

- *“Before HB101, I drank to get drunk. After HB101, I drank to enjoy life.”*
- *“HB101 reinforced my view of beer as a fine drink rather than just drunk juice. It showed me to treat it with respect and to enjoy the finer subtle flavors of a quality beer.”*
- *“HB101 helped me gain an appreciation for the craft and technique of brewing. This allowed me to enjoy the beer I drink more and got me to view beer as a food to be enjoyed rather than a method to get drunk.”*
- *“I changed from viewing beer as an alcoholic drink used to get drunk off of, and began to value it as a drink with full taste and a compliment to a meal.”*
- *“I learned what truly good beer is and that you can enjoy it without overindulging.”*
- *“it taught me a lot about the way that it is made, and how to responsibly enjoy it.”*
- *“It opened up my eyes to different kinds of beer that I would not have tried otherwise. It also showed me that I can enjoy some types of beers without getting drunk.”*

When asked about the most valuable thing they learned in HB101 the survey respondents overwhelmingly (approximately 82%) listed how to brew beer or something similar. However, approximately 4% of the comments cited a renewed appreciation for learning, approximately 5% stated they learned more about their future profession, and nearly 9% cited the opportunity to socialize with both peers and professors. Some representative comments that address this included:

- *“That learning can still be fun. Seriously.”*

- *“The most valuable thing I learned in HB101 was that the Civil Engineer Department at West Point wasn't just out to make my life miserable. The department also provided opportunities to get together with my other civil engineer peers and learn how to make beer, but also appreciate them together on a boat on the Hudson River.”*
- *“That the CM&E department went beyond strictly the classroom, clearly reflecting that the faculty took an interest in their students.”*

When responding to the question about what they enjoyed most about HB101, the results were again telling. Approximately 46% of the comments, the most by far, cited a time to socialize and to better get to know the other students in the civil engineering major. Next most cited was a chance to interact with their professors (22%), and 9.5% provided comments about having fun while learning. The draw of drinking good beer for free cannot be ignored; 14% did mention the beer as the best part of the sessions, but the fact that it was not higher points to some level of success in accomplishing the course's goals.

In assessing the lasting impact of HB101, 36% have homebrewed since graduating. Further, 61% say their taste in beer has been affected to the point they mostly purchase and drink quality beer, which as some said cost more, but they feel is worth it for the taste. If the participants are buying more expensive beer based on taste, this implies that they are drinking it for purposes other than to get intoxicated.

## **Conclusion**

This paper sought to answer the question “Is proper use of alcohol a valid topic for instructing civil engineers, and if so, is HB101 an effective way to influence the attitudes of young civil engineers on the proper use of alcohol?” Given the seriousness and prevalence of the problems associated with overconsumption of alcohol by students and young adults, the answer to the first part of the question could be yes, based only on concern for our students' welfare and desire to see them avoid serious health and other problems. The need to fulfill the BOK's Attitude outcome is an extra affirmation from our profession and makes it an essential issue to be addressed. As for the effect on participants' behavior with alcohol, especially beer, there seems to be some strong indications, through survey data, that it has had a positive effect. The program itself strives to model appropriate behavior, set a standard of behavior when drinking, establish a norm for levels of drinking, as well as establish behavior when drinking appropriate for the profession the participants are about to enter. All of these objectives are actions shown by research to have the ability to affect drinking behavior in a positive manner. The opportunity provided for faculty and student interaction outside the classroom and all the advantages of that on the overall CE program should not be discounted either. While HB101 is at its core a fun activity, and is just one many activities comprising the CE program at West Point, it is not frivolous time wasted, but a valuable contributor to the program and does address a serious issue that faces engineering students and young professionals.

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## Attachment A – Survey Message

*Thanks for looking at this short survey. You are being sent this survey as a graduate of CME Home Brewing Class (HB101).*

*We would like you to think about your experience with HB101 conducted as a voluntary part of your senior year at West Point. We hope you will take a few minutes to answer the questions and reflect on your HB101 experience (the actual brewing sessions, sampling the beers, and the end of the year party).*

*Thank you again for your time, the answers you provide will help in the preparation for an engineering education paper about HB101's role in the CE program at West Point.*

Questions:

1. What year did you graduate from the Civil Engineering Program at USMA?
2. Rate your agreement with the following statements about your experience with HB101.
  - HB101 was an enjoyable experience and I am glad I participated in it.
  - I learned something of value in HB101.
  - HB101 was a valuable part of the CE program, even though not truly a CE course.
  - The HB101 experience was a model of responsible drinking behavior.
    - a. Strongly Disagree
    - b. Disagree
    - c. Neither Agree or Disagree
    - d. Agree
    - e. Strongly Agree
3. Did HB101 affect the way you view and consume beer? If yes please explain how.
4. What was the most valuable thing you learned in HB101?
5. What did you like best about attending HB101 sessions?
6. Have you brewed beer since you left West Point?
  - a. Yes, I am a regular Homebrewer now; I have my own equipment and am still brewing.
  - b. Yes, I have brewed beer once or twice with my own equipment, but have dropped off from brewing now.
  - c. Yes, I have brewed but only with other people, I don't own my own equipment
  - d. No, but I now drink mostly "good beer".
  - e. No, I am back to drinking the cheapest thing I can find!