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**Problem 1.13**

1.13 A couple  $M$  of magnitude  $1500 \text{ N}\cdot\text{m}$  is applied to the crank of an engine. For the position shown, determine (a) the force  $P$  required to hold the engine system in equilibrium, (b) the average normal stress in the connecting rod  $BC$ , which has a  $450\text{-mm}^2$  uniform cross section.

Use piston, rod, and crank together as free body. Add wall reaction  $H$  and bearing reactions  $A_x$  and  $A_y$ .

$\sum M_A = 0:$   
 $(0.280 \text{ m})H - 1500 \text{ N}\cdot\text{m} = 0$   
 $H = 5.3571 \times 10^3 \text{ N}$

Use piston alone as free body. Note that rod is a two-force member; hence the direction of force  $F_{BC}$  is known. Draw the force triangle and solve for  $P$  and  $F_{BC}$  by proportions.

$l = \sqrt{200^2 + 60^2} = 208.81 \text{ mm}$

$\frac{P}{H} = \frac{200}{80} \therefore P = 17.86 \times 10^3 \text{ N}$   
 $P = 17.86 \text{ kN}$

$\frac{F_{BC}}{H} = \frac{208.81}{60} \therefore F_{BC} = 19.643 \times 10^3 \text{ N}$

Rod  $BC$  is a compression member. Its area is  $450 \text{ mm}^2 = 450 \times 10^{-6} \text{ m}^2$

Stress,  $\sigma_{BC} = \frac{-F_{BC}}{A} = \frac{-19.643 \times 10^3}{450 \times 10^{-6}} = -41.4 \times 10^6 \text{ Pa}$   
 (b)  $\sigma_{BC} = -41.4 \text{ MPa}$

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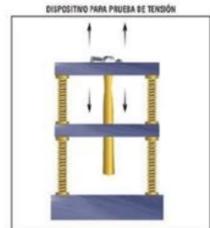
2.1 Introducción

Las propiedades mecánicas de los materiales nos permiten diferenciar un material de otro ya sea por su composición, estructura o comportamiento: así como efecto físico o químico, estas propiedades son usadas en dichos materiales de acuerdo a algunas necesidades creadas a medida que las cosas van avanzando, dependiendo de los gastos y presupuesto de aquella necesidad en donde se aplica en el material para que este soporte o soportará la exigencia creada.

La mecánica de materiales estudia las deformaciones y desplazamientos de estructuras y sus componentes debido a las cargas que actúan sobre ellas, así como nos basaremos en dicha materia para saber de que se trata cada uno de estos efectos físicos, aplicados en diferentes estructuras, formas y materiales. Esta es la razón por la que la mecánica de materiales es una disciplina básica, en muchos campos de la ingeniería, entender el comportamiento mecánico es esencial para el diseño seguro de todos los tipos de estructuras. El desarrollo histórico de dicho tema, ha sido la mezcla de teoría y experimento, de personajes importantes como Leonardo da Vinci (1452-1519), Galileo Galilei (1564-1642) y Leonhard Euler (1707-1783), llevaron a cabo experimentos para determinar la resistencia de alambres, barras y vigas, desarrollaron la teoría matemática de las columnas y cálculo de la carga crítica en una columna, actualmente son la base del diseño y análisis de la mayoría de las columnas.

2.2 DEFORMACIÓN REAL Y ELASTICIDAD

La deformación es el proceso por el cual una pieza, metálica o no metálica, sufre una elongación por una fuerza aplicada en equilibrio estático o dinámico, es decir, la aplicación de fuerzas paralelas con sentido contrario; este puede ser resultado, por ejemplo de una fuerza y una reacción de apoyo, un momento par o la aplicación de dos fuerzas de igual magnitud, dirección y sentido contrario (como es el caso de los ensayos de tensión y compresión).



A year earlier in 1861, France, England, and Spain invaded Mexico, seeking repayment of debts that they had lent to both parties in the Mexican War of Reform, a civil war lasting three years. Photo Courtesy: Getty Images | A child sits at the base of a monument on Olvera Street in Los Angeles on Cinco de Mayo on Wednesday, May 5, 2021. Before you rush out for tacos and dancing, take a minute to learn about the history of the holiday. Some educators have noted that the celebration of the holiday, absent any meaningful education on Mexican history or culture might be reinforcing stereotypes more than honoring a tradition. For many ASMR fans, it's not really a matter of whether science can explain ASMR, but, instead, it's about the fact that it works for them. Photo Courtesy: ASMRSurge/YouTube Throughout his studies on the subject, he's pulled together a list of apparent ASMR health benefits. Some cities have parades and cultural performances. While sombreros and fake mustaches can come across as disrespectful to Mexicans and folks descended from Mexico, buying food or other goods from Mexican-run businesses or learning about Mexican history can keep the spirit and intent of the holiday alive in a way that's fun for everyone. Photo Courtesy: Diego Cervio/EyeEm/Getty Images Since rising in popularity, autonomous sensory meridian response (ASMR) videos have carved out their own little subsection of the internet. Cinco de Mayo is celebrated across the globe in many countries with a large Mexican population. Photo Courtesy: MaryJLeeee/Twitch If food sounds are your thing, look no further than SAS-ASMR, which is the unofficial place to be for over 9 million foodie fans from around the world. However, it didn't become widespread until beer and liquor companies used the holiday to promote sales in the 80s. Top things off with churros and chocolate sauce for desert, and you have a meal worthy of a great celebration. Above all, it tends to get you very relaxed — and very quickly. Some of these include: Inducing sleep and relaxation Reducing stress and anxiety Reducing depression and easing focus for studying, learning, and working Coping with chronic pain While ASMR is not a one-stop fix for any major condition, it seems to be going a long way toward providing listeners and viewers with ways to manage their health concerns. Another barrier? Some Popular ASMR Channels Whether you're already into ASMR or just starting out, there are several great YouTube and Twitch channels worth exploring. In the past, protestors in Los Angeles, home to the largest Cinco de Mayo celebration in the world, protested the erasure of the holiday's cultural significance to promote the day as a drinking holiday. See our User Agreement and Privacy Policy. It feels like something between goosebumps and that delightfully shivery feeling you get when someone whispers in your ear. There are some common misconceptions about what is actually being celebrated each 5th of May, and knowing the actual history behind the holiday will help you appreciate the festivities more and celebrate respectfully! The History of Cinco de Mayo Cinco de Mayo is the celebration of the victory of a Mexican army over invading French forces at the Battle of Puebla on May 5th, 1862. The site was founded by Craig Richard, a professor of biopharmaceutical sciences at Shenandoah University. Cinco de Mayo marks an important victory in the French-Mexican War, and is celebrated today across the globe with Mexican food and drinks, music, dancing and more. Mexico was experiencing significant economic hardship, largely due to predatory loans offered to Mexico years before that served the interests of colonial powers. Be it visual or auditory, typing, tapping, and scratching are often linked to ASMR sensations too. Photo Courtesy: ASMR Rooms/YouTube A few of the most common auditory ASMR triggers include the sound of rain or waves; acrylic nails tapping on a solid object; whispering; book pages turning; a pen or pencil being used to write; crackling fire; and wind. A celebration isn't complete without music and dancing. Chicken flautas, salsa verde enchiladas or avocado quesadillas can replace ground beef tacos as the main course, or you can make mole poblano for a dish straight out of Puebla itself. Cinco de Mayo is often celebrated in the United States with Mexican food and drinks, music, dancing and more. So, why are people so skeptical of it? As mentioned above, sampling cues on YouTube or Twitch is one of the easiest ways to discover what triggers your ASMR sensation(s). So, what exactly is ASMR — and is it a valid, scientifically-backed therapeutic tool or just another trend? However, Cinco de Mayo is not a national holiday in Mexico, and most of the country doesn't observe it. Even now, with more awareness, it can be hard to put ASMR-related sensations into words. And of course, local parades, festivals, concerts or other events are always a good time. Today in Mexico, Cinco de Mayo is celebrated primarily in the state of Puebla, and while the celebration culminates on the 5th of May, the party starts several weeks earlier with musical and theatre performances. Today, the biggest celebrations are held in major cities with significant Mexican-American populations, like Washington D.C., Los Angeles, Houston, Boulder, San Antonio and more. As mentioned earlier, ASMR can also be triggered by certain types of visuals, such as watching someone brush their hair; seeing someone pet or cuddle with a pet; viewing a repetitive task, like folding laundry; watching someone move their hands slowly; and observing someone who is painting or drawing — think Bob Ross, the accidental ASMR pioneer. The French emperor, Napoleon III, was interested in preserving the authority of monarchs across the globe and was simultaneously supporting the Confederate efforts in the United States. People in traditional costumes on scene during free show. Photo Courtesy: iStock | Group of Friend eating Mexican Tacos and traditional food, snacks and peoples hands over table, top view. See our Privacy Policy and User Agreement for details. As MaryJLeeee points out on her channel, "most ASMR is binaural, meaning left and right sounds are heard separately," and, with this in mind, she recommends listening with high-quality headphones to get the best possible experience. Cinco de Mayo Across The Globe So if Cinco de Mayo isn't widely celebrated across Mexico, how did it come to be so popular around the world? Among them is the ever-popular MaryJLeeee, who creates rhythmic ASMR sound experiences — from running her nails over objects to whispering — in order to help listeners with insomnia, anxiety and relaxation. MORE FROM ASK.COM You can even learn zapateado—the type of dance moves often performed to mariachi music, or watch an expert if you're feeling bashful. What Is ASMR? An important thing to remember if you plan on celebrating Cinco de Mayo is that it's not the anniversary of Mexico's independence. France stayed however, attempting to force a puppet monarchy on Mexico, and re-establish its colonial influence over the state. After a brief time it was clear that Mexico would default on its debts, and England and Spain left. For example, ASMRSurge has a great YouTube video that provides over 50 different potential triggers. While most Mexican immigrants have settled in the U.S., there are significant Mexican populations in Canada, some Western European countries, and Australia. Many nonbelievers have mistakenly concluded that an ASMR sensation is inherently sexual, but, in actuality, it's more along the lines of how a sound machine might trigger a specific sensation. Loading Preview Sorry, preview is currently unavailable. Try ASMR Zeitgeist, whose 1.9 million followers love his sensory DJ vibe. Cinco de Mayo Controversy It should be noted that the popularization of Cinco de Mayo has not been without controversy. On the 5th of May, celebrations begin with a re-enactment of the Battle of Puebla. While the Battle of Puebla didn't end the war with France, it was an important symbolic victory that would continue to inspire the Mexican resistance. However, how Cinco de Mayo is celebrated and even who participates in it has changed over time. Of course you can stuff yourself on tacos, guacamole, nachos and other typical Mexican fare, but you might be interested in trying something a little more off the beaten path. Well, this ASMR artist recreates the ambiance of popular settings from movies, like Lord of the Rings, so that you can escape into a calming, ambient atmosphere. One study described ASMR as "the experience of tingling sensations in the crown of the head, in response to a range of audio-visual triggers." Photo Courtesy: WhispersRed ASMR/YouTube In far less scientific terms, an ASMR-induced sensation is sort of like that feeling of intense well-being you get when you see a beautiful sunset or hear an incredible piece of music. They claim that ad campaigns trivialize their culture while also targeting vulnerable communities that already struggle with alcohol addiction. But while ASMR has amassed millions of loyal fans around the world, it's still met with skepticism by those who don't understand it. The day commemorates the Mexican people's victory over French forces at the Battle of Puebla on May 5, 1862. You can download the paper by clicking the button above. It was in this conflict that the Battle of Puebla occurred, and the victory of the smaller, mostly indigenous Mexican army against some of Europe's toughest soldiers inspired the people of Mexico. The short answer: Everyone is different, but there are some common threads. Common ASMR Triggers So, what sort of auditory or visual cues trigger an ASMR response? Looking for something more music focused? If you continue browsing the site, you agree to the use of cookies on this website. Enjoying the Festivities This Cinco de Mayo, you can celebrate while being cautious not to diminish the Mexican history and culture that brought us this holiday in the first place. Photo Courtesy: iStock | Cinco De Mayo Celebration in Los Angeles, USA, crowds of people in El Pueblo district of Los Angeles. Treat yourself to some authentic Mexican food, by visiting a Mexican-owned restaurant in your area. MORE FROM REFERENCE.COM

SlideShare uses cookies to improve functionality and performance, and to provide you with relevant advertising. He hoped to install a monarchy in Mexico, overturning the newly formed democracy, and develop a relationship with the American Confederacy. Some of the earliest ASMR studies suggested that not everyone may be capable of experiencing such sensations, hence the ongoing skepticism, confusion and misunderstanding. If you're curious about what might trigger an ASMR sensation for you, you'll undoubtedly find a lot to comb through on dedicated Twitch and YouTube channels. Why's that? Elote — grilled corn on the cob covered in mayonnaise, cotija cheese and spices — can add a street festival feel to a meal, while a bowl of pozole beef soup makes for a great appetizer. That's celebrated on September 16, the anniversary of the 1810 call by Miguel Hidalgo for independence from Spain, and is comparable to July 4th and the signing of the American Declaration of Independence. Photo Courtesy: Getty Images | A mock French Army prepares to fire small cannons during a reenactment of the 1862 battle between the French and the Zacapuaxtlas Indians as Mexicans celebrate Cinco de Mayo May 5, 2001 in Puebla, Mexico. And while it doesn't have as huge of a following yet, ASMR Rooms provides the perfect escape right now. SlideShare uses cookies to improve functionality and performance, and to provide you with relevant advertising. Though Allen wasn't a scientist, she discovered that she was one of many people looking to put a name to a certain sensation — one that proved difficult to describe. With nearly 3 million followers, Gibi ASMR is one of the undisputed ASMR queens of the internet. The term ASMR was originally coined by Jennifer Allen back in 2010. If you're interested in doing a deep dive into these studies, we recommend checking out ASMR University. From her calming voice to her wide blend of sound props, she's bound to get you relaxed in a matter of seconds. Many might think of mariachi music when it comes to Cinco de Mayo, but there's also grupera, banda, Norteño, Tejano and more to choose from, so don't be afraid to mix things up. In the United States, Cinco de Mayo took off as a holiday when Mexican-American activists used it to celebrate Mexican and indigenous accomplishments during the civil rights movement in the 50s and 60s. On Twitch, you'll find tons of streamers whose channels are dedicated to various kinds of ASMR artistry. And here you'll find Cinco de Mayo celebrations, all mixed with a bit of the local culture. Well, because it's one of those things that's hard to explain unless you've experienced it first hand, ASMR is often misunderstood by folks just discovering the term. Dr. Richard became so fascinated with ASMR that he even wrote a book about it called Brain Tingles. Potential Health Benefits of ASMR When it comes to understanding how, exactly, ASMR works, the jury's still out, but a few studies have shown that experiencing these sensations might have some solid health benefits. After the French are defeated, a parade commences and celebrations begin.

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