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IOWA STATE UNIVERSITY
Institute for Transportation

Project consultation key goal of 2017 Iowa Tribal Summit

It's been three years since the last Iowa Tribal Summit on Cultural Preservation and Transportation was held, which means that participants were eager to meet and continue the discussion.

The three-day event was held from May 31 to June 2 in Tama, Iowa, attracting a total of 81 participants, comprising of 17 tribes/nations and 12 agencies. Topics of discussion included relationship building, conflict resolution, cultural properties, and changing laws related to consultation under the National Historic Preservation Act (NHPA).

While the Act intends to preserve historical and archaeological sites across the nation, it is up to state organizations like the Iowa DOT and FHWA to initiate tribal consultation and provide information and updates on project plans.

During the Summit, Iowa DOT's Brennan Dolan discussed some of the more challenging project types in Iowa's environmentally rich areas, including emergency-related, cultural, and historic projects, along with

corridor studies. He explained that these types of projects deal with a lot of agricultural, state, and environmental issues.

Dolan's presentation sparked further discussion on how consultation can better take place between tribes and agencies in an effort to preserve the land, together. After all, under the NHPA: “Consult is built upon the exchange of ideas, not simply providing information.”

And that is why relationship building was also a major focal point of the Summit, as participants agreed that having a clear and transparent process makes it easier on everyone involved, to better serve everyone's needs. Another important point is that changing relationships often change the rate of successes, and a plan for the future is essential.

Contact

For more information on what happened at the Summit, contact Theresa Litteral, 515-294-4366, litteral@iastate.edu. ■



Iowa Tribal Summit
on Cultural Preservation
and Transportation



2017 Iowa Tribal Summit attendees pose together at the end of the meeting.

Acronyms and Abbreviations in *Technology News*

AASHTO	American Association of State Highway and Transportation Officials
APWA	American Public Works Association
FHWA	Federal Highway Administration
IHRB	Iowa Highway Research Board
InTrans	Institute for Transportation (at ISU)
Iowa DOT	Iowa Department of Transportation
ISU	Iowa State University
LTAP	Local Technical Assistance Program
MUTCD	Manual on Uniform Traffic Control Devices
NACE	National Association of County Engineers
TRB	Transportation Research Board



U.S. Department of Transportation
Federal Highway Administration



About LTAP

LTAP is a national program of the FHWA. Iowa LTAP, which produces *Technology News*, is financed by the FHWA and the Iowa DOT and administered by the Institute for Transportation at Iowa State University:

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From the director: Iowa statewide “mousetrap” competition – 2017 and beyond

This summer, the Iowa LTAP reintroduced our statewide “Build a Better Mousetrap” competition. Mousetraps, as noted on our website, are unique solutions to common problems. They can be tools, software, equipment modifications, or a new or improved process or approach. They are innovations that help local transportation agencies become more efficient and effective.

Although the competition is new this year to Iowa, sharing ideas about local innovations has occurred here for many years. For instance, we share innovation ideas at the annual County Engineers Research Focus Group, typically held in February. This event includes the identification and prioritization of research ideas and an innovations discussion that provides an opportunity for county engineers to introduce some of the new actions, tools, and/or processes/policies they have implemented.

In addition, we also have a time during our Streets and Roads Workshop and Annual Conference where county and city maintenance personnel are provided an opportunity to suggest and offer their ideas on innovations. This meeting is held annually each fall —this year it is from September 19–21 (registration is open at www.intrans.iastate.edu/events/streets_roads/). Ideas for this discussion are submitted both before and during the conference.

And a third event, which we started in 2017, is called the City Public Works Research Focus Group. In the future, one of the meeting objectives will be to include an innovations discussion similar to what occurs during meetings of the County Engineers Research Focus Group.

This year, we submitted several ideas to the national “mousetrap” competition that were suggested through our general advertisement and several more from ideas discussed at Streets and Roads. Sioux County, with their survey pin puller, won second place nationally. A plaque, along

with a \$100 gift certificate for National Highway Institute training, was provided by the FHWA at the National Local and Tribal Technical Assistance Program Association meeting in July. This honor will also be recognized at Streets and Roads, along with a luncheon at the Secondary Roads Department in Sioux County.

Iowa's statewide “mousetrap” will continue in 2018, and the approach will be adjusted to account for what we learned this year.

In addition, through 2017 and 2018, the Iowa LTAP will continue to share additional information on innovations that Iowa selected within the fourth round of the FHWA Every Day Counts initiative. Seven or eight of these measures were discussed in August at a meeting with county engineers and will continue to be mentioned at APWA meetings and other county engineer meetings over the next year. The objective is to determine what measures are most important to Iowa cities and counties. These results will help Iowa LTAP further focus its activities. Currently, it appears that the measures focusing on pavement preservation, ultra-high performance concrete, and possibly hydraulics are of the most interest to county engineers.

Please note our list of workshops coming in the next few months and don't forget to register for Excavation Safety and Local Road Safety Workshops.

Stay safe. ■

Keith

Q&A with leaders at the Center for Transportation Research and Education

What sets CTRE apart from other centers at Iowa State University's Institute for Transportation is its in-depth research in traffic safety, broad and extensive programming, and initiative to collaborate with a variety of partners in both industry, local and federal government agencies, and elsewhere.

Led by Director Omar Smadi, CTRE is supported by a number of researchers and program leaders, such as InTrans Associate Director Neal Hawkins (REACTOR Lab), Center for Weather Impacts on Mobility and Safety (CWIMS) Director Zachary Hans (ITSDS), and transportation research specialist Inya Nlenanya (IPMP).

Neal, tell us about REACTOR.

REACTOR stands for “Real-time Analytics of Transportation Data,” which combines massive data streams, high-performance computing capabilities, and a talented group of faculty, staff, and students focused on problem solving. REACTOR can complete numerous calculations within seconds, which we turn into real-time solutions and decision support.

The Lab was officially established in 2014 with researchers Anuj Sharma, Skylar Knickerbocker, and myself sharing the responsibilities as co-directors. Our goal is to extend beyond the boundaries of traditional research and create both a teaching as well as a research and support laboratory. We find ourselves continually transforming to meet the needs of the Iowa DOT as well as work for the National Science Foundation and FHWA.

What are some of your current projects?

REACTOR is currently working on a number of big impact projects, including statewide performance monitoring, work zones performance monitoring, predictive analytics, and the TIMELI project, which is led by Anuj Sharma and funded by the National Science Foundation.

The goal for TIMELI, which stands for the “Traffic Incident Management Enabled by Large-Data Innovations,” is to use emerging large-scale data analytics to reduce the number of road incidents through proactive traffic control and to assist operators in the statewide traffic management center.

How does REACTOR impact local agencies in Iowa?

Let's face it, we live in a world of big data and that amount of information can be difficult for almost any agency to use, so REACTOR provides access to big data analytics using traffic, weather, and other data that otherwise would not be available. REACTOR supports these agencies by handling data requests and any analysis or visualization of the data. A recent example of this involves a project with a private consultant and input from metropolitan planning organizations looking at travel-time reliability in Iowa. REACTOR processed all of the probe data used to support the analysis, including different reliability measures, and provided them with the ability to visualize reliability on specific corridors.

Zach, tell us about ITSDS.

The Iowa Traffic Safety Data Service provides agencies with the most readily available crash data analysis resources in Iowa. It was created to fill the gap between what safety data users can gather for themselves and what they can obtain from experts. It is for anyone who needs to examine crash data to make decisions about funding, improving roads, implementing enforcement, writing reports, designing presentations, or increasing traffic safety awareness.

Nearly anyone can submit a data request. We've gotten them from concerned citizens, engineers, researchers, law enforcement, etc.

How does the ITSDS impact local agencies in Iowa?

Local agencies often request data directly from ITSDS but are also supported through other statewide efforts like fall safety workshops, law enforcement conferences, corridor and special enforcement projects, road safety audits, and multi-disciplinary safety team support.

A while back, in 2011, we completed a data request for a local Iowa fire department. They needed the data as part of their application for an Assistance to Firefighters Grant, which was awarded to them at a value of almost \$600,000. They sent us a thank you: “Our Department feels that all of the work you and ISU did in getting us local statistics on emergency vehicle intersection collisions was one of the major reasons we got our grant. Our request was last

minute, and we got a lot of great information in a very short period of time. We are grateful and SAFER in our responses because of what you do for Iowa and the region.”

Inya, tell us about IPMP.

The mission of the Iowa Pavement Management Program is twofold: support the management, planning, and programming needs of transportation agencies and provide pavement management information, tools, and training for project- and network-level activities.

IPMP promotes optimal, cost-effective decisions on highway maintenance, rehabilitation, and reconstruction using accurate past and projected pavement conditions.

What are some of your current projects?

Last year we started an IPMP Users' Group that meets quarterly with local agencies with an aim to increase capacity in terms of data-driven pavement management in Iowa. This group provides agencies with training, data, and support with their pavement management plan. Another project being done is designing a geographic information system interface that will allow local agencies to interact and have access to their own current and historic data.

How does the IPMP impact local agencies in Iowa?

IPMP data provides an invaluable tool that local agencies use for project prioritization. Our pavement management training and support helps make local agencies better stewards of taxpayer dollars. For instance, when one agency passed a 1 percent local option sales tax, that agency used the IPMP data and deliverables to come up with a comprehensive pavement management plan to take advantage of the additional income.

For more information

On CTRE and its programs, visit www.ctre.iastate.edu/ ■

ctre

Center for Transportation
Research and Education

Iowa LTAP Mission

To foster a safe, efficient, and environmentally sound transportation system by improving skills and knowledge of local transportation providers through training, technical assistance, and technology transfer, thus improving the quality of life for Iowans.

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Countermeasures improve pedestrian safety

Pedestrians account for more than 17.5 percent of all fatalities in motor vehicle traffic crashes, and the majority of these deaths occur at uncontrolled crossing locations such as mid-block or unsignalized intersections. These are among the most common locations for pedestrian fatalities generally because of inadequate pedestrian crossing facilities and insufficient or inconvenient crossing opportunities, all of which create barriers to safe, convenient, and complete pedestrian networks.

Expecting pedestrians to travel significantly out of their way to cross a roadway to reach their destination is unrealistic and counterproductive to encouraging healthier transportation options. By focusing on uncontrolled locations, agencies can address a significant national safety problem and improve quality of life for pedestrians of all ages and abilities.

Pedestrian safety countermeasures

The FHWA is promoting the following pedestrian safety countermeasures through the fourth round of Every Day Counts (EDC-4):

- Road diets can reduce vehicle speeds and the number of lanes pedestrians cross. They can also create space to add new pedestrian facilities.

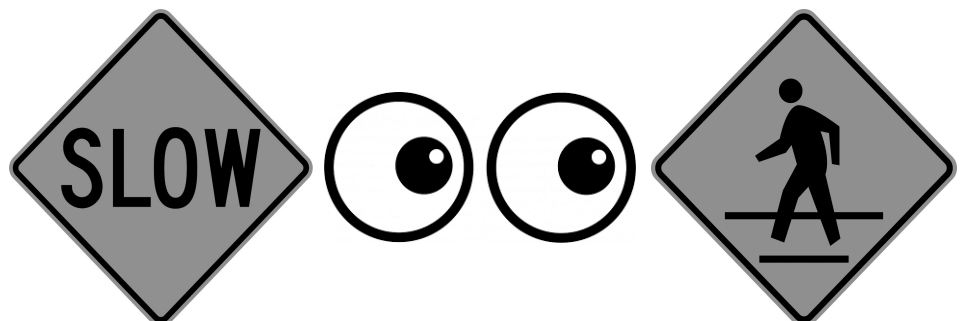
- Pedestrian hybrid beacons (PHBs) are a beneficial intermediate option between rectangular rapid flash beacons (RRFBs) and a full pedestrian signal. PHBs provide positive stop control in areas without the high pedestrian traffic volumes that typically warrant signal installation.
- Pedestrian refuge islands allow pedestrians a safe place to stop at the midpoint of the roadway before crossing the remaining distance. This is particularly helpful for older pedestrians or others with limited mobility.
- Raised crosswalks can reduce vehicle speeds.
- Crosswalk visibility enhancements, such as crosswalk lighting and enhanced signing and marking, help drivers detect pedestrians—particularly at night.

PEDSAFE online tool

Countermeasures are being promoted through FHWA's PEDSAFE, an online tool that helps transportation agencies diagnose and treat pedestrian safety issues. PEDSAFE provides a decision process to select the most applicable countermeasures for a specific location. It also includes numerous case studies that describe how communities across the country have implemented these safety improvements.

Originally published in June 2017 (Vol. 25, No. 2) edition of Minnesota LTAP's *Technology Exchange*. ■

Every Day Counts is the FHWA's initiative to advance a culture of innovation in the transportation community in partnership with public and private stakeholders. Every two years, FHWA works with state departments of transportation, local governments, tribes, private industry, and other stakeholders to identify a new set of innovative technologies and practices that merit widespread deployment through EDC. ■



Don't forget to **SLOW DOWN** and **LOOK** for **PEDESTRIANS** crossing roadways and walkways.

From the Safety Desk: Ahead of the curve(s)

By David Veneziano, Iowa LTAP Safety Circuit Rider

Are you prepared for the upcoming MUTCD requirements?

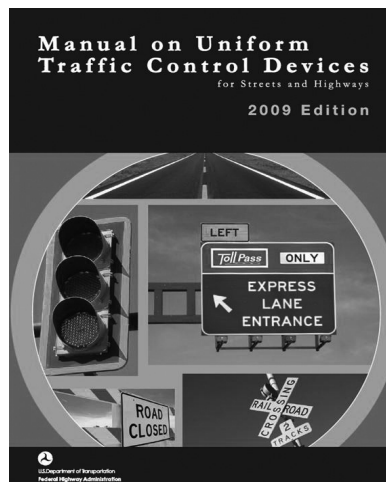
From time to time LTAP receives questions related to the upcoming December 31, 2019, compliance date related to requirements on the use of different horizontal alignment signs. While the compliance date is still two years away, it is a good idea to be familiar with what the MUTCD is requiring or recommending and prepare accordingly.

Section 2C.06 discusses horizontal alignment warning signs. The standard that section provides states the following: “In advance of horizontal curves on freeways, on expressways, and on roadways with more than 1,000 AADT that are functionally classified as arterials or collectors, horizontal alignment warning signs shall be used in accordance with Table 2C-5 based on the speed differential between the roadway’s posted or statutory speed limit or 85th-percentile speed, whichever is higher, or the prevailing speed on the approach to the curve, and the horizontal curve’s advisory speed.” At first glance, a review of Table 2C-5 would make it appear as though horizontal alignment (Turn, Curve, Reverse Turn, etc.), Advisory Speed Plaques, and Chevrons or One Direction Large Arrow signs are uniformly required on roadways where a difference between the speed limit and advisory speed for a curve exceeds 10 miles per hour. But this is one of those cases where reviewing all of the information on a subject in the Manual between the text and a table is important.

A review of the footnotes accompanying Table 2C-5 shows the following statement: “See Section 2C.06 for roadways with less than 1,000 ADT.” Looking back at the text in that section, we find the option that “Horizontal alignment warning signs may also be used on other roadways or on arterial or collector roadways with less than 1,000 AADT based on engineering judgement.” This does not mean that horizontal alignment warning signs can’t or shouldn’t be used on our roadways with 1,000 AADT that are not classified as arterials or collectors. The MUTCD recognizes that there is a need for flexibility in application

while maintaining uniformity in signing, hence the engineering judgement statement and the use of curve-related signing in such cases.

What the compliance date and the MUTCD information boils down to is this: Roadways that are arterials or collectors over 1,000 AADT and have a speed differential of a particular value in Table 2C-5 that indicates signing is required will need to have sign(s) installed prior to December 31, 2019. Otherwise, in



the case of roadways below 1,000 AADT, sign installation is left to engineering judgment. However, while a sign may not be required, its use should be considered when inspecting a curve, especially as the speed differential between the tangent and curve increases. In light of this, now might be a good time to review that information (or collect it) for all curves on your system.

We know that there are going to be curves out on our roadways that are not presently signed that may need to be before the upcoming compliance date. Correspondingly, there are a few things an agency should do to prepare. Curves on an agency’s system that meet the MUTCD volume and functional classification criteria listed above should be identified and their speed differentials checked to determine if they require signage. If that information does

not currently exist, it will need to be collected, which means performing a curve speed study. Support information on the approaches available to conduct that study is covered in MUTCD Section 2C.08.

As a reminder, the Iowa LTAP recently acquired a pair of digital ball bank indicators that are available to local agencies for free loan to conduct curve speed studies faster and more accurately. Contact us if you’re interested in borrowing one.

If there are any questions related to the horizontal alignment sign compliance date or any signing-related questions, please give us a call (or email). And as in all aspects related to signing, when in doubt, “Think safety.” ■

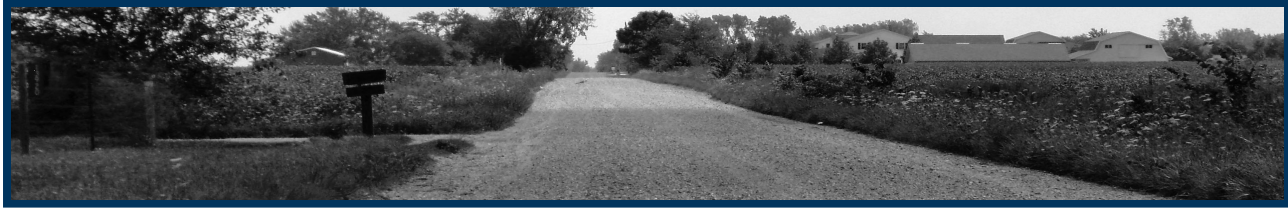
What is a digital ball bank indicator?

A ball bank indicator measures the overturning force (side friction), in degrees, of a vehicle traveling through a horizontal curve. The digital ball bank works by collecting and recording this data electronically as a vehicle passes through a curve. Data is collected for multiple passes through a curve in each direction at a consistent speed (set via cruise control). A maximum and minimum degree of ball bank is reported by the device and the larger of these values is recorded for each run in both directions. After multiple runs through a curve, an average ball bank value for each direction of travel can be calculated and used to determine the appropriate advisory speed for the curve.

Contact

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Researchers seeking new way for counties to recycle gravel on roads



When water receded from the massive 2011 Missouri River flood, Pottawattamie County gravel roads were buried in loess silt, the fine-grain soil of western Iowa's scenic Loess Hills.

To reopen the rural roads, the county wanted to do more than simply scrape off the loess along with the gravel and start over with all new material. How could they efficiently screen the existing gravel out of the silt and recycle it? No one had a practical solution, so the county rebuilt the road with clean material.

The question, however, intrigued Iowa State University's Jeramy Ashlock and Cheng Li. Ashlock, a researcher at the Institute for Transportation and associate professor in the Department of Civil, Construction, and Environmental Engineering, and Li, now a post-doctoral researcher, embarked on a study to better recycle gravel and return it to the roads.

"This issue became a problem statement submitted by the Pottawattamie County engineer," he said. "The research project evolved from the original idea of screening materials out of the road, to adding in other materials in controlled gradations while reusing the existing materials to give the best strength and durability.

"We're recycling what's already there but has been worn down by traffic to a finer gradation."

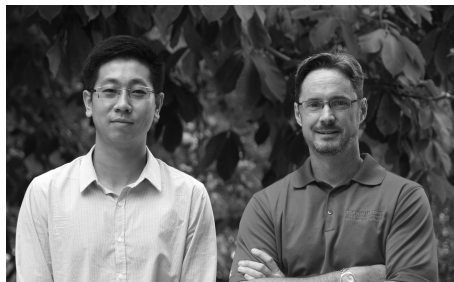
The researchers are developing an easier and better way for county engineers to measure the existing materials on their roads then use a spreadsheet under development to determine what mixtures of other granular materials are needed for optimal performance.

A granular-surfaced road (a more accurate term than gravel road) may contain gravel and sand, silt, and even small amounts of clay—the "fines" or the finest size range of soil. A good granular mixture requires the correct gradation (size distribution of the gravel pieces) and the right plasticity (the correct amount of fines to hold the gravel together). With too much plasticity, the fines will turn into a muddy mess in the rain. With too little plasticity, the

fine material won't bind the gravel, which then tends to get bounced off the road by passing vehicles. In either instance, road maintenance and costs increase.

Ashlock said not all gravel is alike. Limestone gravel from southwest Iowa, for example, tends to be soft. Hence, one size does not fit all, and the best gradation mixtures vary by location depending on locally available aggregate sources.

The project used lab and field tests to determine a target gradation of materials for optimum strength. "We used what's called Fuller's Model, a particle size distribution model, to give us a target gradation," Ashlock said.



Researchers Cheng Li and Jeramy Ashlock from Iowa State University

He said after engineers figure out the gradation of existing materials on the road, they can turn to the spreadsheet. The spreadsheet can determine the best mixture ratio of different materials to add in to get close to the target Fuller's Model gradation to give it the best, long-term performance.

"The idea is to optimize the gradation of what you put down on the road rather than just put down whatever you already have. This way, you can use some of the existing material for the new road.

"If you get the tightest particle packing, you'll get the best performance, the longest life possible for the road. That is where we're headed right now. We call it more performance-based specs."

Ashlock and Li are testing different granular gradations on five 500-foot test sections in Pottawattamie County. They learned a key to optimum road performance was compaction. "We found that just adding vibratory compaction is a huge improvement," Ashlock said.

Lab and field testing took place before and after winter freeze-thaw cycles to see how the different material mixtures performed. Spring thaw is critical for testing because that's when the material is at its weakest.

"The roads are subjected to heavy loads from spring agricultural traffic," Ashlock said. "Also, the road is frozen below the surface so moisture on top can't flow downward and is trapped in the saturated top zone. The traffic then tears up the road."

County engineers are assisting the project by performing construction, and reporting maintenance requirements and tracking what sections performed well. "We're learning which sections had rutting, potholes, raveling, and other moisture-related problems."

The ISU researchers also are working on much simpler plasticity lab tests that county engineers can easily perform.

"The common tests for plasticity limits, if done by different people, often give different results," Ashlock said. "So we're looking at more repeatable and easy-to-perform test methods. We anticipate they will be much easier than existing methods that typically require experienced certified geotechnical labs to do the testing."

In the end, the researchers want to provide county engineers with the tools to rapidly assess the current materials on their roads, and determine the best recipe for improved performance and longevity.

Research funds were provided by the Iowa Department of Transportation and the Iowa Highway Research Board. ■

Conference calendar

Date	Event Name	Location	Contact
October 2017			
3-5	2017 APWA Operator Training and Roadeo	Cedar Rapids	Dan Werts
4-6	2017 APWA Iowa Fall Conference	Dubuque	Jon Dienst
11	Local Road Safety Workshop	Cedar Rapids	David Veneziano
12	Local Road Safety Workshop	Ottumwa	David Veneziano
18	Local Road Safety Workshop	Charles City	David Veneziano
19	Local Road Safety Workshop	Ames	David Veneziano
23	Excavation Safety	Storm Lake	Paul Albritton
24	Excavation Safety	Tripoli	Paul Albritton
24	Local Road Safety Workshop	Storm Lake	David Veneziano
25	Excavation Safety	Sigourney	Paul Albritton
26	Excavation Safety	Atlantic	Paul Albritton
26	Local Road Safety Workshop	Atlantic	David Veneziano
November 2017			
8	Winter Maintenance Training	West Des Moines	Bret Hodne
9	Winter Maintenance Training	Council Bluffs	Pat Miller
December 2017			
5-7	Iowa County Engineers Association Annual Meeting	Ames	Keith Knapp

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Event details and online registration

Watch for details and online registration information, by specific dates and events, on the Iowa LTAP Workshops page, www.iowaltap.iastate.edu/workshops/ltap-workshops/. ■

Iowa LTAP Tech Corner—CDL Prep mobile app

What is it?

CDL Prep is the best way to prepare for the Commercial Driver's License (CDL) General Knowledge exam, along with other endorsement exams of its kind. What makes CDL Prep stand out is its comprehensive practice questions on the following topics: General Commercial, Air Brakes, Combinations, Hazmat, Passenger, Tanks, School Bus, and Doubles/Triples. This mobile app was made by independent developer Jeffrey Diaz.

Features

1. Over 500 questions to practice with.
2. Exam Mode – 60 minutes to answer 50 randomly chosen questions, or 40 minutes to answer 20 to 30 questions on endorsement topics. At the end, review your score and any incorrect answers.
3. Practice Mode – Answer questions and receive instant feedback if you answered incorrectly.
4. Answer Randomization – Answers to questions will not always be in the same position.
5. Performance Tracking – Review your performance on every question.

Red = You have an average score less than 70 percent

Orange = You have an average score between 70 to 89 percent

Green = You have an average score of 90 percent or above.

Where can I get it?

Currently, the app is available for Android mobile devices 4.0 and up.

Visit the Google Play Store at play.google.com/store/apps/details?id=com.jeffreydiaz.android.app.cdlprep&hl=en to download the free app today. ■

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