



ACN 109 200 900

**AUSTRALIAN SECURITIES EXCHANGE ANNOUNCEMENT**

**23 November 2015**

**EDENCRETE™ - US UPDATE**

**EDENCRETE™ RECEIVES FAVORABLE VOTE FROM  
GEORGIA DOT NEW PRODUCTS EVALUATION  
COMMITTEE: NOW ALLOWED FOR USE**

Perth-based Eden Energy Limited (ASX: EDE) is very pleased to announce that the 56 day results from the recent Georgia Department of Transportation (GDOT) field trial of EdenCrete™ enriched concrete on Interstate Highway I-20 in Augusta, Georgia, USA, (see ASX:EDE -19 October 2015) and which produced:

- a 45.8% improvement in the compressive strength over the control mix, and
- a 56% reduction in the depth of wear of the concrete in an accelerated abrasion trial,

were considered by the GDOT New Products Evaluation Committee (“the Committee”) at its meeting on 19 November 2015 in Atlanta.

Eden applied for GDOT approval of EdenCrete™ for use in GDOT’s Class 24-Hour Accelerated Concrete mix for highway repairs, that was used in the I-20 field trial of EdenCrete™, and which represents just under 20% of the total concrete that GDOT uses.

Additionally, Eden also sought approval from GDOT to conduct a further field trial with GDOT in Georgia early in 2016, of EdenCrete™ in the Class A concrete mix that GDOT uses in the construction of pavements, roads and highways, and which is the mix that GDOT uses for a majority of its concrete requirements.

Eden has now received verbal advice from the Committee members that both these applications were favourably received, and Eden now awaits the formal written advice from the Committee setting out full details of the terms and conditions of each approval. Eden anticipates receiving this formal advice in two to three weeks.

The preliminary advice that has been received is that EdenCrete™ will initially be “Allowed for Use” in GDOT’s Class 24-Hour accelerated concrete mix by concrete suppliers to GDOT. However, because EdenCrete™ is a novel admixture containing nano-materials, no GDOT specifications currently exist for its use. Consequently, GDOT has advised that it will present the results from the I-20 Field Trial to its engineers and designers with a goal of designing precise specifications to cover the future use by GDOT of EdenCrete™ in concrete. The timing of this process is not certain but the department’s estimate is in the range of three to six months.

For personal use only

In relation to the proposed further field trial of EdenCrete™ in the Class A concrete mix, the preliminary advice is that the request to conduct a further field trial has been approved but the details of what the Committee decided are not yet known, and will be detailed in the formal written advice.

Although the details of the outcome from the Committee meeting have not been received, Eden is extremely happy with the highly encouraging preliminary advice, and awaits the formal letters in due course.

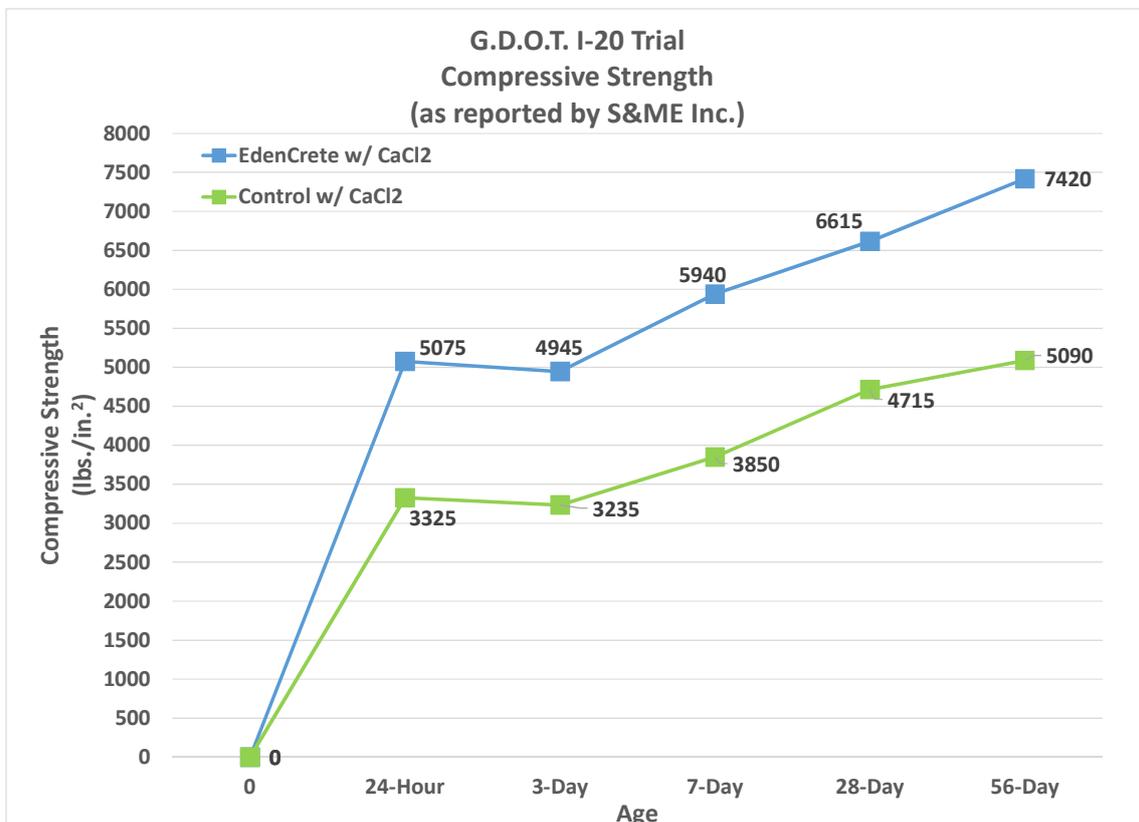
The 45.8% improvement referred to above, in the compressive strength that EdenCrete™ delivered in the I-20 Field Trial, compared with the control mix, was derived from the raw data that was actually measured in the concrete used in the field trial, without the results being normalised for the differing air content in the two samples as was previously announced. GDOT requested that rather than the normalised data, the raw data should be presented to it, as this is the basis upon which they assess the performance of the concrete in their field trials.

These compressive strength results (being the raw numbers without normalisation to adjust for differences in air entrainment) and the abrasion resistance results, from the GDOT I-20 Field Trial, are set out below.

#### ***GDOT- I-20 Field Trial -Compressive Strength Results (ASTM C39)***

The compressive strength results through the 56-day trial are shown in Figure 1 below, and the tabulated results are shown in Table 1 below. The column in orange in Table 1 shows the substantial increases in compressive strength of the concrete enriched with EdenCrete™ over the reference mix.

The independent, GDOT approved, S&ME Inc. laboratories, conducted the compressive strength tests in Augusta, Georgia, in accordance with ASTM Standard C39.



**Figure 1: Compressive Strength Results, GDOT I-20 Trial (ASTM C39)**

	Fresh Properties		
	EdenCrete	Control	
Amb. Temperature	95	89	
Ambient Cond.	Sunny, Clear	Overcast	
Conc. Temperature	94	92	
Slump	2.50	4.75	
Air Content	2.7	6.0	
Unit Weight	148.1	139.9	
	Compressive Strength (lbs./in. <sup>2</sup> )		
Age	EdenCrete	Control	EdenCrete % Increase
0	0	0	N/A
24-Hour	5075	3325	52.6
3-Day	4945	3235	52.9
7-Day	5940	3850	54.3
28-Day	6615	4715	40.3
56-Day	7420	5090	45.8

**Table 1: Tabulated Fresh and Hardened Concrete Properties GDOT I-20 Trial (ASTM C39)**

From 24-hours through 7-days, EdenCrete™ increased the compressive strength of the reference concrete by an average of more than 50%, by more than 40% at 28 days and by nearly 46% at 56-days. These strengths achieved by EdenCrete™ are more than double at 28-days, and 41% more at 56-days, than those required in GDOT Section 504 –*Class 24-Hour Accelerated Concrete Specification*.

***GDOT- I-20 Field Trial –Abrasion Resistance (ASTM C779)***

Test cylinders from the I-20 Field Trial were also tested by Intelligent Concrete, Inc., a laboratory in Colorado with the appropriate test equipment, to evaluate the benefits in abrasion resistance at 56-days that EdenCrete™ enriched concrete delivers. Testing was conducted according to ASTM C779: *Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces*. Results of the abrasion testing are shown in Figure 2 below, with the test cylinders showing the wear rings after the tests, shown in Figure 3 below, with the substantial reduction of visible aggregate in the EdenCrete™ test cylinder being clearly evident.

At 56-days, EdenCrete™ had increased the abrasion resistance of the concrete mix by approximately 57%. After the 20 minutes duration of the test, the total magnitude of abrasion measured for the EdenCrete™ sample was actually lower than the level of abrasion the reference cylinder sustained in less than 5 minutes. This can be seen from the graph in Figure 2. It should also be noted that the wear rings on the samples are also showing a significant difference for the EdenCrete™ cylinder relative to the reference. When the test was complete, the reference test cylinder is left with a rough, uneven surface under the wear path of the steel balls, but the EdenCrete™ test cylinder is left with a smoother, more uniform wear path with significantly less visible aggregate as shown in Figure 3.

This difference illustrates the ability of EdenCrete™ to both harden and toughen the concrete surface and increase the capability of enduring a much more abrasive environment than the reference. The increased strength and the pull-out resistance of concrete made with EdenCrete™ can be credited with this characteristic. Because the aggregate in the EdenCrete™ sample does not pull out, the steel balls primarily simply pass over the surface of the EdenCrete™ sample instead of actually abrading as it, as seen with the reference in Figure 3 and the pulling out of aggregate from the cement paste matrix.

ASTM C 779 - Procedure C  
Abrasion Resistance of EdenCrete500

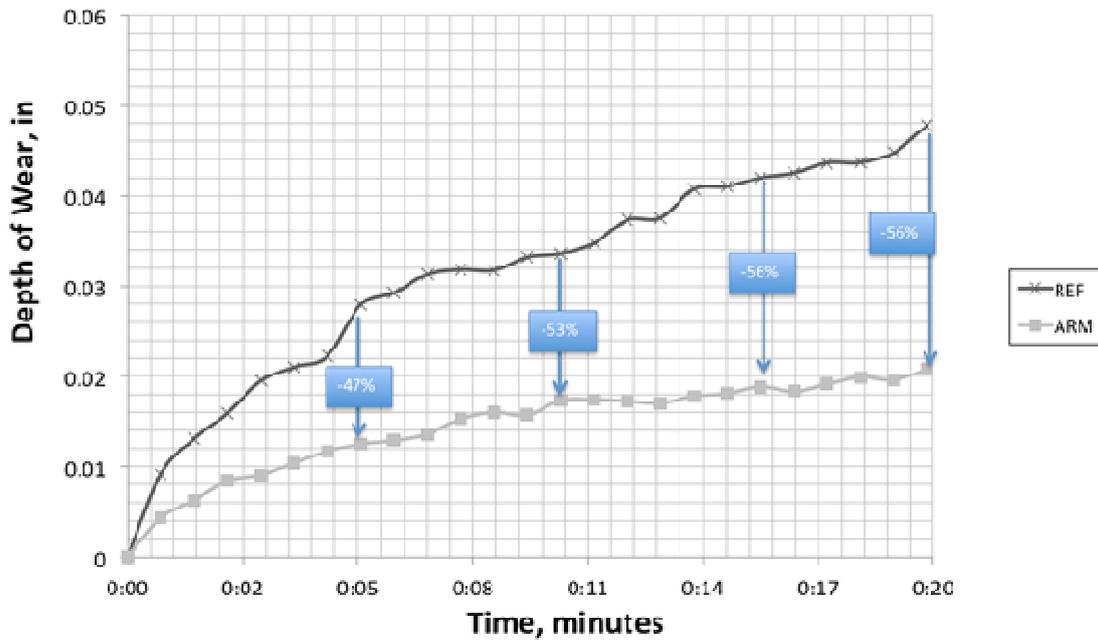


Figure 2: 56-Day Abrasion Resistance Results (ASTM C779), GDOT I-20 Trial



Figure 3: Photograph of test cylinders after abrasion testing- EdenCrete™ cylinder on the right with the shallower wear ring and far less visible aggregate

As a conclusion from these results, Eden considers that, with the addition of EdenCrete™, it may be possible to reduce the cement content of the Class 24-Hour accelerated mix and still achieve the strengths required within the Sect. 504 specification. However, more testing would need to be conducted to evaluate the strength of such a mix having less cement, its performance during placement and over a longer test period.

## Georgia Infrastructure Market

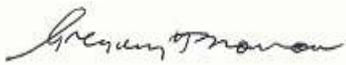
In addition to thousands of miles of concrete roads and highways, Georgia has in excess of 15,000 concrete bridges (ranging from small to large), a recent audit of which indicated that over 4,000 were not suitable for repair and need to be replaced over the next 20 years, at an estimated annual cost in excess of \$300 million per year.

If this process in Georgia results in a full approval by GDOT of the use of EdenCrete™ in concrete for all its infrastructure being obtained and specifications for its use being developed, it is considered likely to accelerate the process of obtaining similar approvals by the Departments of Transport in other US States, with Eden's longer term objective being the opening up of the national US infrastructure market.

The directors of Eden are now of the opinion that the I-20 laboratory test results detailed above, coupled with the advice of preliminary approvals from GDOT, confirm the very significant progress that has been made towards Eden eventually achieving its longer-term goal of broad penetration of EdenCrete™ into the huge US infrastructure market.

### **BACKGROUND**

*EdenCrete™ is Eden's 100% owned, proprietary carbon-strengthened concrete additive, one of the primary target markets for which is improving the performance of concrete used in the construction and maintenance of concrete roads, bridges and other infrastructure. Additionally, it has potential for use in a range of other applications including high-rise building construction, marine and coastal applications, water storage and pipelines, and pre-fabricated concrete structures and products.*



**Gregory H. Solomon**  
Executive Chairman