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COVER LETTER

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Dear Editor,
I wish to submit an original research article entitled "[Experimental Study on the Use of Used Can Waste as Aluminum Anode for Anti-Corrosion Agent of Steel Reinforcement in Reinforced Concrete Exposed to Aggressive Environments] for consideration by SINERGI.

We confirm that this work is original and has not been published elsewhere, nor is it currently under consideration for publication elsewhere. We promise not to withdraw this article after it has been processed by the Editorial Team. If there is a withdrawal, we are willing to pay a penalty of USD 150 (IDR 2000K) to the SINERGI Editorial Team.

In this paper, I/we report on / show that:

Field	:	Civil Engineering
Topic	:	Concrete and Material Engineering/Maintenance Engineering
Brief Background	:	Reinforced concrete structures are a significant factor in creating strong and durable buildings, especially in critical infrastructure, such as bridges. However, steel reinforcement embedded in reinforced concrete structures often suffers from corrosion caused by chlorides, a major worldwide problem. This reinforced concrete is a mixture of concrete and steel that serves as tensile-resistant reinforcement. This reinforcement is specifically designed to strengthen concrete in an area of construction work. Damage to reinforced concrete can appear in several forms based on causes and environmental conditions. These include cracking, chemical deterioration, damage from excessive loads, surface erosion, and corrosion. Furthermore, extreme temperature changes and freeze-thaw cycles can expedite concrete degradation, causing a notable reduction in structural performance. Corrosion in concrete is a chemical or electrochemical reaction between reinforcing steel and concrete layers that have corrosive properties. In addition, The corrosion process occurs naturally, that is, the metal re-compounds with oxygen as raw materials in the metallurgical extraction process of metal making, which also compounds with oxygen. Structural damage caused by corrosion can

		reduce the service life and capacity of reinforced concrete structures because corrosion causes a reduction in the area of reinforcing steel. Corrosion repair of steel reinforcement embedded in concrete is a step to maintain the durability of concrete from corrosion exposure. One of the corrosion prevention measures that is often used in general is Cathodic Protection (CP), which is a system of controlling the corrosion of steel structures in an electrolyte environment by flooding the steel using electrons so that the steel potential to the environment drops to the protection potential, where the steel is technically considered not corroded. One of the most frequently used methods is sacrificial anode cathodic protection (SACP). SACP is a sacrificial anode system method, where the anode is corroded and the cathode is not corroded by providing a sacrificial anode to the metal being protected. A sacrificial anode can reduce the corrosion rate because the potential difference between the anode and the steel causes a positive current to flow in from the anode to the steel. Hence, the entire steel surface becomes more negatively charged and becomes a cathode. Aluminum and Zinc are metals often used as sacrificial anodes. Beverage cans are known to have a high aluminum content composition. The composition of beverage cans consists of Al by 93.75%; Mg by 4.82%; Mn by 0.27%; Fe by 0.26%. Aluminium is the most widely used metal after steel, this is due to the characteristics of aluminum, which is lightweight (specific gravity = 2.7 g/cm3), has high thermal and electrical conductivity, and has high resistance to corrosion due to a thin oxide layer that sticks very strongly to the surface of an aluminum metal. In addition, beverage cans have the potential to be used as sacrificial anodes in the form of pieces or as cast to reduce the corrosion rate of steel.
Research Problem	:	Based on the above introduction, no previous research used the waste beverage cans as the sacrificial anode in concrete. This research aims to overcome damage to building materials, namely reinforced concrete, that is subject to corrosion. The recycled aluminum from used cans can be used as a substitute for zinc in the cathodic protection of sacrificial anodes. In addition, recycled aluminum is also intended to reduce the negative impact of the accumulation of tin can waste. Thus, through this research, the problem of corrosion rate in reinforced concrete can be resolved by examining the comparison of the potential and effectiveness of using recycled aluminium and zinc phosphate for corrosion prevention using the sacrificial anode cathodic protection method.
Overview of Method	:	The materials will be tested for physical properties, including specific gravity, water absorption, sand silt content, and gravel wear. The ACI 211.1-91 mix design method was used in this test with a block mold with a size of 45 cm x 25 cm x 10 cm and given a hole with a diameter of 12 mm, which aims to place steel reinforcement. A total of 20 concrete test specimens were made. The manufacture of concrete specimens begins with the determination of the composition of the material (mix design). After

		that, the casting of test specimens is carried out, and a process called curing is carried out. The curing process is carried out by covering the test specimens using water-soaked gunny sacks for 28 days. After the curing process has passed, concrete compressive strength testing, concrete split tensile testing, and concrete flexural testing are carried out.
Significant finding	:	1. Waste cans used as zinc replacement corrosion protection and the sacrificial anode cathodic protection (SACP) method yield satisfactory results. 2. Based on Scanning Electron Microscope (SEM) testing, the dominant aluminum content was 87.12%. 3. The current value in wet-dry or aggressive conditions has increased, so it can be said that the recycled aluminum anode successfully protects the reinforcement. 4. The depolarisation test shows a value of more than 100 mV, indicating that using anodes from used beverage cans with the anode cathodic protection (SACP) method is successful.

We have no conflicts of interest to disclose.

Thank you for your consideration of this manuscript.

Sincerely,
[*Pinta Astuti*]

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AUTHORSHIP STATEMENT

I wish to submit an original research article entitled "[Recycled-Aluminum Anode from Used Waste Metal Cans as Anti-Corrosion of Steel Reinforcement of Reinforced Concrete in Aggressive Environments]" for consideration by SINERGI.

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated sufficiently in work to take public responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript.

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Please submit 3 (three) potential reviewers (*that have not listed in SINERGI*) to speed up the review process that competent for the topic and has a good reputation in that area.

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