FABRICATION OF MAGTNETIC MATERIAL COLLECTING TROLLY BY USING ELECTROMAGNETIC

ABSTRACT

The intention of this mechanical engineering project is to fabricate a magnetic material collecting trolley by using electromagnetic. Since complete automation is very complex and even research facilities haven't come up with one, you better design one that is operated via manual control.

This is a working project and as usual requires the help of industrial purpose . This trolley is 4 wheeled with an arm to collect scrap magnetic materials. It also can move over small obstacles with the support of the frame.

Though this project may sometimes look simple, it requires much effort to actually make one working model.

An **electromagnetic field** is a physical field produced by electrically charged objects. It affects the behaviour of charged objects in the vicinity of the field. The electromagnetic field extends indefinitely throughout space and describes the electromagnetic interaction. It is one of the four fundamental forces of nature.

The field can be viewed as the combination of an electric field and a magnetic field. The electric field is produced by stationary charges, and the magnetic field by moving charges (currents); these two are often described as the sources of the field.

INTRODUCTION-

In machine shops the metal chips are removed along with other waste materials found in the shop floor. In this method, the metal chip segregation from waste becomes tedious. Hence a machine that can accomplish the removal of metal chips along will be a better option for the usage of removed chips in metal reprocessing. we are adopting an faradays law of electro magnetic induction for the working principle by this process and electromagnetic can be collected the chips in a floor. Electromagnetic coil fitted with this machine induces a magnetic flux. A plate attached to the bottom of the machine is magnetized due to the induced magnetic flux.
The magnetized plate attracts the metal chips present on the floor. The attracted chips can be collected in a pan when the coil is demagnetized by cutting off the power supply.
Project is very interesting. We are using trolley for collecting a metal scrap . We using electromagnet coil to collect scrap. Coil need 5 to 12v DC. Better voltage-better collecting power. Trolley help us to collect scrap from every corner and from everywhere.
In this project we will control trolley manually with holding Handel. We will control different functions of moving trolley. As we know the value of electromagnetic metal collector. it can be used in manufacturing industry, domestic, food, leather, auto parts etc. In this project we will make frame body arrangement for trolley which will have functions to control like forward, backward, right and left.

OBJECTIVE

This research develops Computational metal scrap models and conducts experimental in recycling metal chips from the manufacturing industry through electromagnetic separation approach. The objectives of this research are to:

1) establish a novel treatment method to recover economic values from metal chip waste from manufacturing industry;

2) if successful, lead to a patent application and possibly create internship and job opportunities with Wisconsin manufacturing industry;

3) investigate both theoretical knowledge and experimental skills on recycling of metal chips through the experimental setup, data collection, and preliminary result analysis. This project will benefit society and Wisconsin industry in metal chips recycling both monetarily and environmentally.

NEED FOR AUTOMATION

Nowadays almost all the manufacturing process is being automised in order to deliver the products at a faster rate. The manufacturing operation is being atomised for the following reasons.

- To reduce wastage of time
- for collect a waste materials
- To increases the scrap collection
- To reduce the material cost
- To reduce the production time
- To reduce the material handling
- To reduce the fatigue of workers
- Less Maintenance

PROBLEM DEFINITION

For collecting a scrap metal at industries and other critical places is difficult. Electromagnetic method is to develop the method for collecting the scrap metal pieces and some other important tool will be detected through this method. And demagnetize after the colleting process. And using electromagnetic field creation for solving the present problem.

LITERATURE SURVEY

This report summarizes the results of a top-level literature survey on the topic of the electromagnetic (EM) effects on marine biota. The primary driver for this survey was to determine the basic state of knowledge on the topic of potential biological effects that EM fields (EMF) may have on marine species, and then to apply that knowledge to identify EMF sensing requirements. In particular, specific knowledge was sought on species sensitivity to field strength to electric or magnetic fields and on the frequency range of such sensing sensitivity. It was noted as a result of the survey (Table 1) that EM sensitivities varied significantly by species. Elasmobranchs (sharks and skates) were noted to have extreme sensitivity to lowfrequency AC electric fields, including the area between 1/8th to 8 Hz, but no notation was made for sensitivity to magnetic fields. Telost fish, including salmonids, also have an electric field sensitivity, but one that is orders of magnitude lower (less sensitive) than sharks. Elasmobranchs provide the most stringent requirement for electric field sensing, with some species sensitive to levels as low as 1 nV/m (1 x 10-9 volts/meter). On the other hand, benthic species and some marine mammals have been observed to be affected to varying degrees by magnetic fields, but not electric fields. Magnetic sensing requirements appear to be driven by eels, which the literature reports as having sensitivities to magnetic fields on the order of a few µT (1 x 10-6 Tesla). Some benthic species have been shown to be affected by stronger magnetic fields, although there has been little research reported on the subject of certain species native to the Pacific Northwest, including the Dungeness crab. In summary, a number of species were reported to be sensitive to EM fields, and could potentially be affected by EM fields created by wave energy devices and cables. Thus, instrumentation used to assess the impact of EM fields should provide adequate resolution to allow direct measurement of known sensitivity levels. Furthermore, it would be desirable, but not required, to investigate instrumentation that is capable of measuring levels below the known levels of sensitivity to enable future research on any collected data that may have an observable impact.

The transmission of electricity from a WEC device to the onshore facilities may involve either a direct current (DC) or an alternating current (AC). DC is characterized by a constant flow of electrical charge in one direction, from high to low potential, while in AC the magnitude of the charge varies and reverses direction many times per second. The B-fields from these two types of electrical current interact with matter in different ways. While AC induces electric currents in conductive matter, both interact with magnetic material, such as magnetite-based compasses in organisms (Ohman et al. 2007).

Electric (E) fields are produced by voltage and increase in strength as voltage increases, while magnetic fields are generated by the flow of current and increase in strength as current increases. EMF consists of both E- and B-fields. The presence of magnetic B-fields can produce a second induced component, a weak electric field, referred to as an induced electric (iE) field. The iEfield is created by the flow of seawater or the movement of organisms through a B-field. The strength of E- and B-fields depends on the magnitude and type of current flowing through the cable and the construction of the cable. In addition, shielding of the cable can reduce or in essence eliminate E-fields. Overall, both E- and B-fields, whether anthropogenic or naturally occurring, rapidly diminish in strength in seawater with increasing distance from the source. The type and degree of observed EMF effects may depend on the source, location, and characteristics of the anthropogenic source, and the presence, distribution, and behavior of aquatic species relative to this source. Since EMF levels decrease in strength with increased distance from the source, it may be surmised that fields emitted by a submerged or buried submarine cable would have more effect on benthic species and those present at depth than on those occupying the upper portion of the water column. While logical in conclusion, this assumption has not yet been validated in an in-situ environment with EMF measurement and observation. Organisms that can detect E- or B-fields (i.e., electro-sensitive species) are presumed to do so by either iE-field detection or magnetite-based detection, either attracting or repelling an animal. Electro-sensitive species detect iE-fields either passively (where the animal senses the iE-fields produced by the interaction between ocean currents with the vertical component of the Earth's magnetic field) or actively (where the animal senses the iE-field it generates by its own interaction in the water with the horizontal component of the Earth's B-field (Paulin 1995, von der Emde 1998). Data on the detection of B-fields by marine species is limited. Research shows that electrosensitive aquatic species have specialized sensory apparatus enabling them to detect electric field strengths as low as 0.5 microvolt per meter (µV/m). These species use their sensory apparatus for prey detection and ocean navigation (McMurray 2007). For example, members of the elasmobranch family (i.e., sharks, skates, and rays) can sense the weak E-fields that emanate from their prey's muscles and nerves during muscular activities such as respiration and movement (Gill and Kimber 2005). Magnetosensitive species are thought to be sensitive to the Earth's magnetic fields (Wiltschko and Wiltschko 1995, Kirschvink 1997, Boles and Lohmann 2003, McMurray 2007, Johnsen and Lohmann 2008). While the use of B-fields by marine species is not fully understood and research continues (Lohmann and Johnsen 2000, Boles and Lohmann 2003, Gill et al. 2005), it is suggested that magnetite deposits play an important role in geomagnetic field detection in a relatively large variety of marine species including turtles (Light et al. 1993), salmonids (Quinn 1981, Quinn and Groot 1983, Mann et al. 1988, Yano et al. 1997), elasmobranchs (Walker et al. 2003, Meyer et al. 2005), and whales (Klinowska 1985, Kirschvink et al. 1986), many of which occur in the Pacific Northwest. 4.1 Changes in Embryonic Development and Cellular Processes The ability to detect E- and B-fields starts in the embryonic and juvenile stages of life for numerous marine species. For example, through controlled experiments it has been shown that B-fields have been found to delay embryonic development in sea urchins and fish (Cameron et al. 1993; Zimmerman et al. 1990, Levin and Ernst 1997). Several studies have found that EM fields alter the development of cells; influence circulation, gas exchange, and development of embryos; and alter orientation. Research on sea urchins showed that 10 µT to 0.1 T (100 Gauss [G] to 1,000G) static B-fields are able to cause a delay in the mitotic cycle of early urchin embryos. These fields also increase greatly the incidence of exogastrulation, a mental abnormality in sea urchins (Levin and Ernst 1997). Furthermore, barnacle larvae passed between two electrodes emitting a high frequency AC EMF, caused significant cell damage to the larvae and caused the larvae to retract their antennae, interfering with settlement (Leya et al. 1999).

However, in a study involving chum salmon (O. keta) , Prentice et al. (1998) found no increase in the percentage of egg production/female, fertilization rates, larval mortality or deformity rates, or overall survival in the EMF-exposed fish. Formicki and Perkowski (1998) exposed embryos of rainbow trout (O. mykiss), a common resident of Oregon, in different development stages to the influence of constant, low B-fields: 5 µT and 10 µT (50 G and 100 G, respectively). An increased oxygen uptake in embryos influenced by the field activity (as compared to those, which develop in a geomagnetic field) was observed. Researchers also noted the effect of a B-field on the breathing process of embryos was more pronounced in periods of advanced morphogenesis. In addition, Formicki and Winnicki (1998) exposed brown trout (Salmo trutta) and rainbow trout to similar constant, low level magnetic B-fields (0 to 13 mG [0 G to 0.013 G, respectively]) to the aforementioned study. Results showed this exposure slowed the embryonic development of both species. Furthermore, in this same study, Formicki and Winnicki found B-fields also induced change in the circulation of embryos and larvae of pike (Esox lucius) and carp (Cyprinus carpio), as well as in the embryos of brown trout. Formicki and Winnicki concluded that while intensity of breathing processes increase in a magnetic field, they concluded it was dependent on the stage of embryonic development and was especially manifested in the period of an advanced organogenesis. In another study, embryos of rainbow trout and brown trout exhibited a sense of direction both in natural and artificially created B-field (Tanski et al. 2005). In a controlled experiment, fish embryos in artificially generated 0.5, 1.0, 2.0, and 4.0 µT (5, 10, 20, and 40 G, respectively) horizontal B-fields, superimposed on the geomagnetic field were compared to the orientation in the Earth's B-field (i.e., the control). The artificially generated constant B-fields were found to induce significantly stronger orientation responses in embryos, compared to those elicited by the geomagnetic field alone. However, additional research on pike embryo failed to show changes in locomotive responses to varying B-fields (Winnicki et al. 2004).

Benthic Species There is little information on benthic species' sensitivity to magnetic fields. No studies on B- or E-field impacts to Dungeness crab, an important commercial and recreational fishery in Oregon, have been conducted. However, several studies have examined the effects and use of B- and Efields on crustaceans of similar size and the same order (i.e., Decapoda). In addition to other cues, such as hydrodynamics and visual stimuli, spiny lobster (P. argus) also uses the Earth's magnetic field to orient (Boles and Lohmann 2003). Lohmann et al. (1995) used B-fields to demonstrate that spiny lobster altered their course when subjected to a horizontal magnetic pole reversal in a controlled experiment. However, even under the influence of anthropogenic fields, no negative impacts have been observed in crustacean. For example, no ill effects were detected in western rock lobster (Panulirus cygnus) after electromagnetic tags, emitting a 31 kHz signal, were attached to them (Jernakoff 1987). Furthermore, when the blue mussel (Mytilus edulis), along with North Sea prawn (Crangon crangon), round crab (Rhithropanopeus harrisii), and flounder (Plathichthys flesus), were all exposed to a static B-field of 3.7 μT (37 G) for several weeks, no differences in survival between experimental and control animals was detected (Bochert and Zettler 2004). However, an investigation on the blue mussel did show effects of B-fields on biochemical parameters (Aristharkhov et al., 1988). Changes in B-field action of 5.8, 8, and 80 μT (58, 80, 800 G, respectively) lead to a 20% decrease in hydration and a 15% decrease in amine nitrogen values, regardless of the induction value. 4.3 Teleost (Bony) Fish Species Eels exhibited some sensitivity to EMF (Centre for Marine and Coastal Studies (CMACS) 2003). Magnetosensitivity of the Japanese eel (A. japonica) was examined in laboratory conditions (Nishi et al. 2004). This species was exposed to B-fields ranging from 12,663 to 192,473 nT (0.12663G to 0.192473 G). After 10 to 40 conditioning runs, all the eels exhibited a significant conditioned response (i.e. slowing of the heartbeat) to a 192,473 nT (0.192473 G) B-field. Researchers concluded that the Japanese eel is magnetosensitive.

WORKING DESCRIPTION

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APPLICATIONS

¬ Open field work.

¬ Using replaceable, battery, it can be used in indoors also.

¬ Used in assembly section.

ADVANTAGES

¬ Low running cost.

¬ Battery power source. ¬ Pollution free.

¬ Automatically collecting the scrap in the all sections of industry.

DISADVANTAGES

¬ High Initial cost.

¬ Battery charging time is high.

¬ VEHICLE does not sense the obstacle in the VEHICLE paths.