# Soares Book on Grounding–Errata for the 9th Edition

N. Srinivasan

**Abstract**

This article provides the errata for the 9th Edition of this book. These have already been communicated to the author of this illustrious book.

A list of corrections and suggestions on the book, SOARES Book on Grounding and Bonding, Ninth Edition.
First of all, let me state that this is a good book.
Here are the comments:

1. Appendix B, Why Measure Soil Resistivity?

   Figure B-1, page 378

   This Table pertains to soil resistivity. The book specifies the units as V-cm. Instead, the units should be Ohms-cm.

2. Page 381

   There are two corrections that are needed in this page:

   The first one pertains to the equation in column one. This equation, as written in the book is in a single line. It should be split into two lines as follows:

   $R = pL/A$

   Resistance = Resistivity X Length/Area

   The second one pertains to the formula given in the next column for a single ground electrode. It should be corrected to read as follows:

   $R = (p/2.pi.L)(ln(4L/r) - 1)$

   Please refer to the IEEE Standard 142, 1991, page 131, which provides a Table of formulas for various electrode configurations.

3. Page 383, Figure B-13

   The word “Ammeter” should be replaced by “Voltmeter.”

4. Preface, Page 9

   In the third paragraph, the word “principle” should be replaced by “principal.”

5. Chapter 1, Page 11

   A. “ac” should preferably be replaced by “AC”.

   B. “The three elements are added vectorially, not directly.”

   The above sentence should preferably changed to read, “The three elements are added phasorially, not directly.”

   The reason for the above recommended change is that the mathematics of vector analysis does not apply to electrical circuits AC or DC. For example, vectorial operations such as Curl, DIV, and the concept of Vector Cross Product do not apply to electrical circuits.

   C. Inductance

   “Inductance is caused by the magnetic field of an alternating-current circuit as a result of the alternating current changing directions.”

   There is more than one error here.

   Inductance is NOT caused by the “magnetic field of an alternating-current circuit. . . ”
   “. . . alternating current changing directions” is redundant, because that is why it is called an alternating current.

   The above sentence will read better if rephrased as follows:

   Inductance is the ability to store magnetic energy. Capacitance is the ability to store electrical energy. Every current carrying conductor automatically produces a magnetic field surrounding it. Inductance is a measure of the ability to store energy in its magnetic field.

   D. Page 12

"...cut the conductor"

The above phrase is better deleted. The word "cut" has a literal meaning, namely, to take a pair of pliers and physically cut the conductor.

"Induction is the current effect of an ac circuit."

This is an erroneous statement that is likely to mislead newcomers to the field.

Induction occurs whenever the magnetic filed changes. These changes need not be caused by an AC circuit. A DC circuit can also cause a changing magnetic field such as when you connect a battery to a circuit. The transient that occurs before the circuit settles into a steady state will produce a changing magnetic field as shown by:

Ldi/dt + iR = E, where E is the impressed DC Voltage.

Induction will result in inductive reactance ...

"Induction is measured as inductive reactance."

A certain level of precision in language is needed in technical books to prevent confusion in newcomers to the field.

E. Figure 1-3, page 13

This Figure combines both DC quantities and AC quantities in a single Figure, and hence introduces some errors.

This figure has an embedded picture that has a caption, "Ohms Law (basic)".

There is only one Ohms Law. The addition of basic should be removed.

“Impedance formula (basic)” : There is only one Impedance formula, the one shown in your figure. As far as I know, there is no “advanced” formula for Impedance.

Also, this same Figure defines Current as “Intensity.”

“Current” is not intensity. Current is the rate of flow, measured in Coulombs per second, Amperes for short.

There are other errors in this Figure that need to be corrected.

The word “Vectorially” occurs again on this page. It should be changed to “Phasorially.”

F. Page 14

“ . . . alternating current changes . . . direction 120 times per second . . . ”

Yes, in the utility power systems in the United States.

Actually, alternating current can change direction any number of times as you please. For example, in aircrafts 400 hz is common. Radio frequency is another example, so is the audio frequency that powers your speakers in the stereo.

G. Pages 18 and 19

It is not clear by looking at the three Figures 1-11, 1-12, and 1-13, what is implied or what is the correct practice.

It will be instructive to show the Figures, one marked correct and the other marked Wrong.

H. Page 20, paragraph titled “Insulated”.

This paragraph should be re-written using better English.

I. Figure 1-16

Is this Figure suggesting the correct practice or a wrong practice?

Actually, if you look at the Figures 1-16 and 1-17, it is hard to tell what the message is.

J. Page 23

"When checking the voltage to ground, it is found to be about 240 Volts."

This is referring to a 480 Volts, ungrounded delta system.

It is not clear from reading the text, how the 240 Volts to ground is arrived at.

This scenario needs further clarification.

K. Figures 1-23 and 1-26

It should be clearly explained what is the difference between these Figures. They both essentially look the same.

6. Chapter 2, Page 44, Figure 2-10

It is difficult to infer what this Figure implies.

It will be informative if another figure shows how this circuit should be wired.

What exactly is wrong with this Figure? Is this earthing OK? After all, this is intended as a tutorial book.

7. Chapter 3

   A. Page 52

   "6 AWG or Smaller"

   By "smaller" is it meant smaller in AWG or smaller in physical size?

   B. Page 59

   "Mike, Insert a picture possible from Bussmann, this is not a fuse here."

   This sentence should be removed.

8. Chapter 6

   A. Page 98

   Change "bulding" to "building".

   B. Figure 6-20, Page 108

   Change "Ampmeter" to "Ammeter".

9. Chapter 7

   A. Figure 7-5, page 117

   This Figure shows in two places "Grounding Electrode Conductor". Only one should be a "Grounding Electrode Conductor." The other one should be marked, "Grounding Electrode."

   B. Page 117

"This term was added . . . although is has been used in 250.30 . . . "

10. Chapter 8, Page 135

    This page refers to a Table 1.

    There is no Table 1 either in this Chapter or elsewhere in this book. All Tables are provided in Chapter 20. Chapter 20 has nothing numbered "Table 1".

    The Table numbers should be properly numbered and referred to in the text.

11. Chapter 9

    A. Page 151, Figure 9-1

    This Figure has the caption, "Equipment grounding conductor connected to equipment enclosure."

    It is not clear by looking at the Figure, which one.

    A well-placed arrow will clarify the point.

12. B. Page 158

    Section Title, "Size of Equipment Grounding Conductor"

    Paragraph 2: This refers to 15 Amperes, and 18 AWG, refers to 250.122(E).

    If you refer to the Table in the adjoining page, it points out only a 14 AWG for 15 Amps.

This is extremely confusing.

C. Page 159

This page refers to Table 6 in Chapter 20. There are no Tables in Chapter 20 named Table 1. All references should be properly numbered.

D. Figure 9-7, Page 160.

This Figure refers to a Table 8, Chapter 9. There is no such Table I can find.

E. Equipment Grounding Conductors for Motor Circuits, Pages 160 and 161.

In this paragraph, 250 percent of 40 Amperes is calculated as 250X40= 1000 Amps.
It appears it should be 100 Amps.

Please compare this with a subsequent calculation on page 161, where a 1300 per cent value is computed to be 40X13 = 520 Amperes.

13. Chapter 12, Page 212

A. Figure 12-2

It appears that the arrow is pointed at the wrong conductor.