ANTENNA DESIGN COURSE

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CHAPTER 6

ANTENNA FABRICATION

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6.1 General Considerations

Usually the construction of small antennas do not require expensive or difficult to find materials. Additionally quite often the techniques to construct them are not particularly difficult ones. Those are two aspects which facilitates the construction of small antennas. But it is also true that usually the construction of this type of antennas requires time and some dedication.

In next section the common materials and tool required to construct small antennas are presented. After that, in Section 6.2 an example of antenna fabrication is presented, just to give a general view of this task.

6.2 Materials and Tools

In the following two sections a list of common used materials and tool is presented. Obviously these materials and tools depends on the type of antenna to construct. But the following one are basic elements for wire and patch antennas, which will be the most used type of antennas that will be using in this course.

6.2.1 Required Materials

In Fig. 6.1 some materials commonly used to construct wire and patch antennas as: FR4 laminate, perchloride, tin, solder paste, copper wire, silicone bars, heat shrink tape, etc. are shown.

Fig. 6.1. Common materials for constructing wire and patch antennas.

6.2.2 Required Tools

In Fig. 6.2 commonly used tools to construct small antennas are shown.

Fig. 6.2. Tools and protections commonly used to construct small antennas.

6.2.3 Required Auxiliary Systems

In Fig. 6.3 a Fiberglass tripod is shown. This kind of tripods are very useful for measuring the radiation pattern of antennas, because these ones do not affect the measurements as it will happen with metal tripods.

Fig. 6.3. Fiberglass tripod used for radiation pattern measurements.

Quite often is needed to construct some auxiliary system for example to make the measurements, specially if the laboratory in which you work do not have specific measurement equipment like anechoic chambers or GTEM cells.

Fig. 6.4. Dielectric base constructed to be fixed to the Fiberglass tripod during radiation pattern measurements.

6.3 Example of a Constructed Antenna

The following figures show some antennas constructed in our laboratory in the last years.

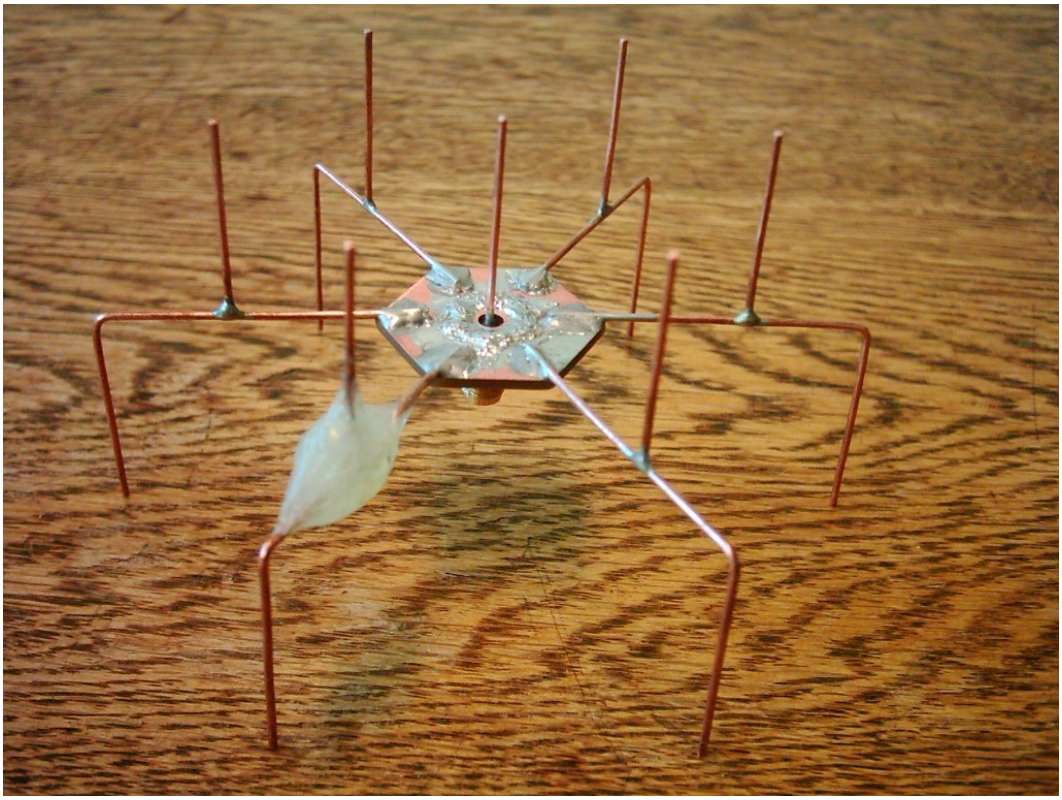

Fig. 6.5. SPIDA with one director element.

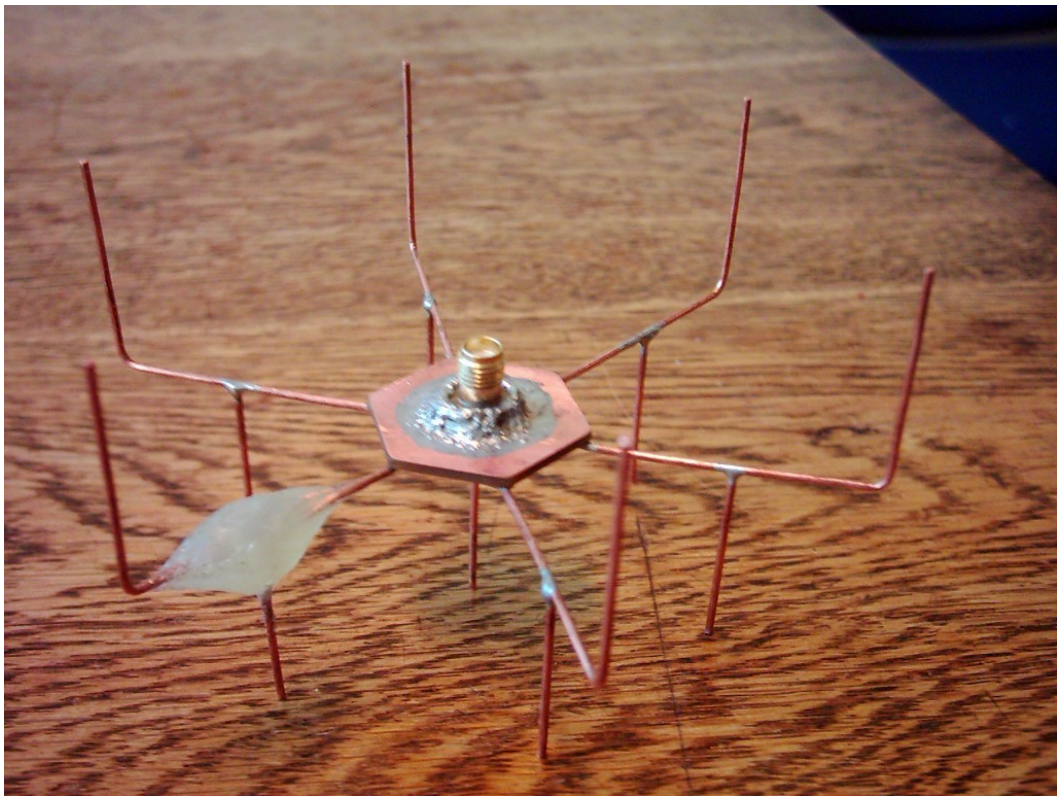

Fig. 6.6. Bottom view of SPIDA with one director element.

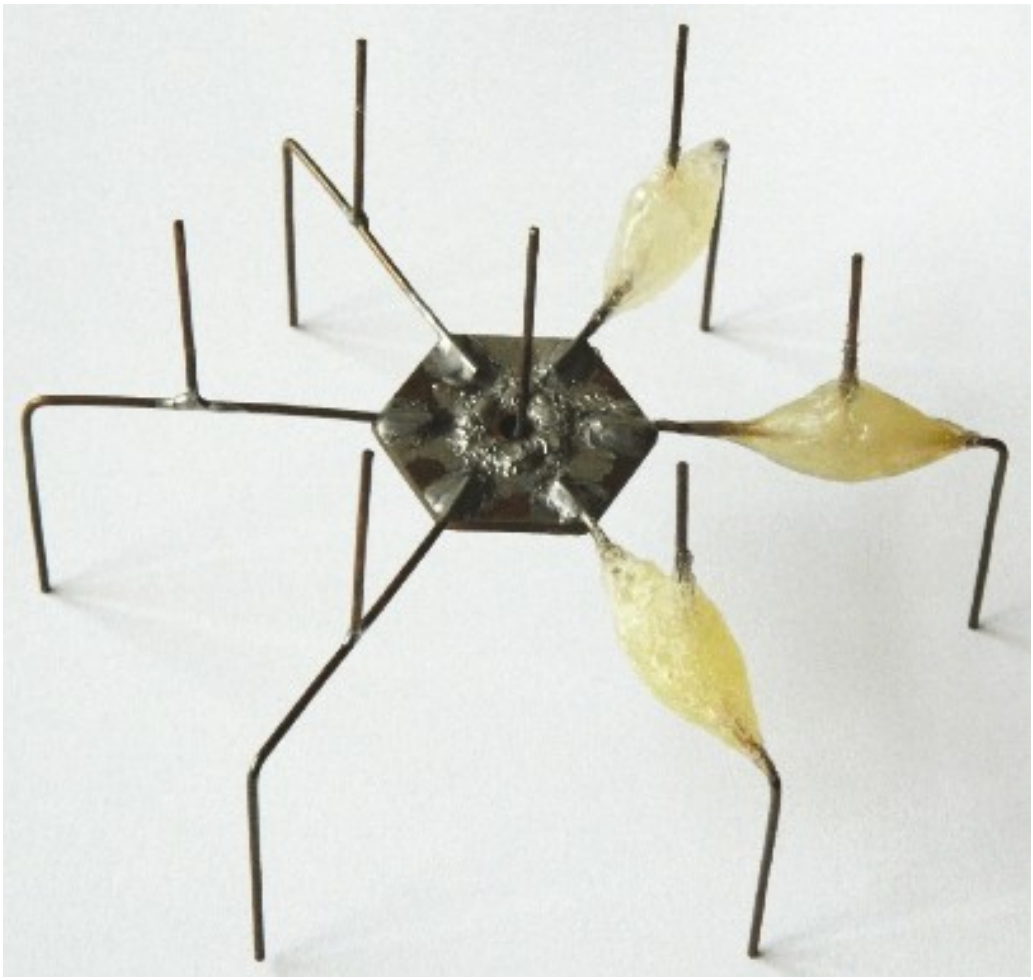

Fig. 6.7. SPIDA with 3 director elements.

In Fig. 6.8. the SPIDA with 3 director elements is conditioned to be tested when it is embedded in materials with high permittivity. When different materials are used, as in this case Polipropilen (PP), the electric properties of these materials must be considered.

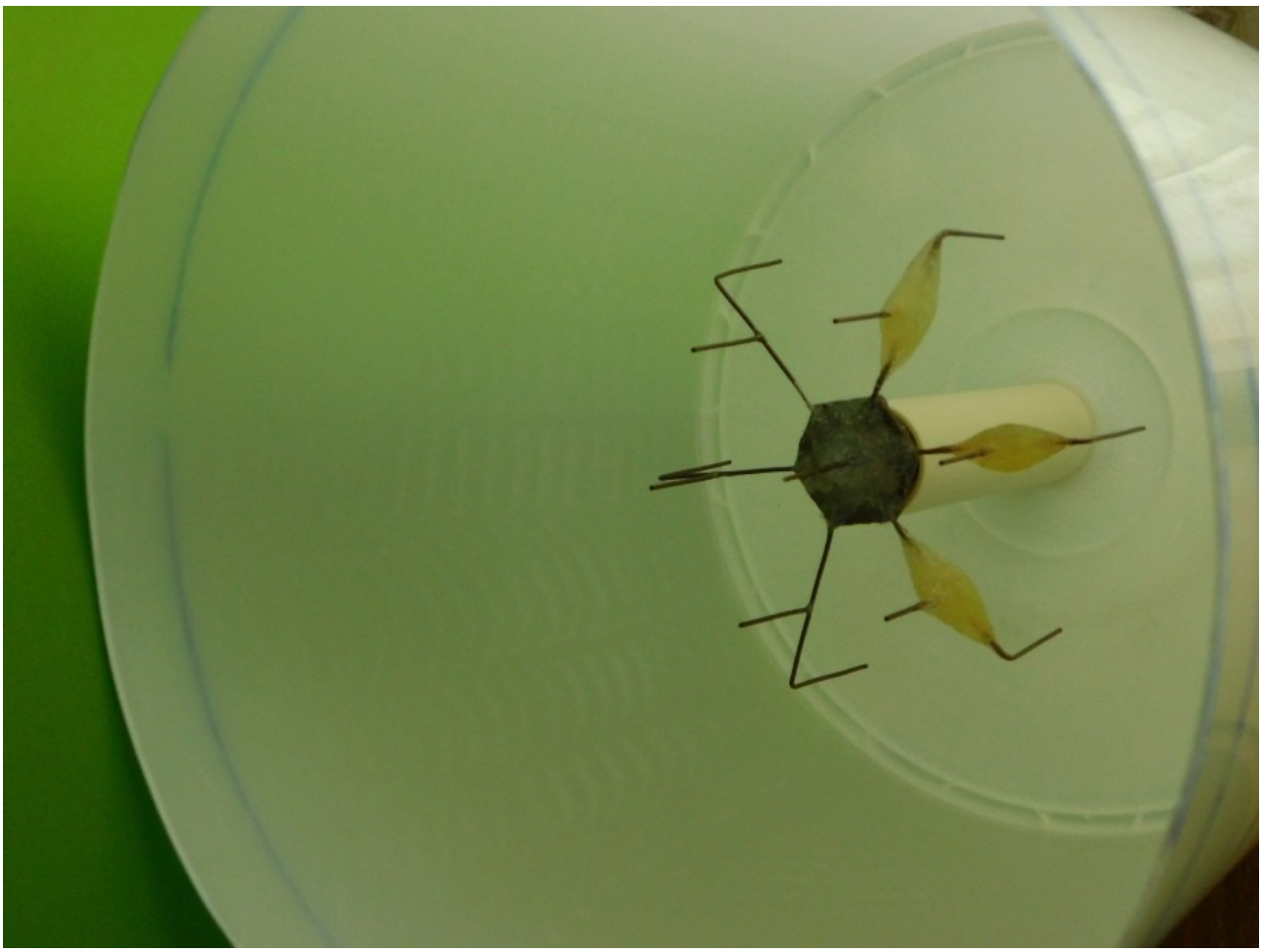

Fig. 6.8. SPIDA with 3 director elements and container for materials with high permittivity.

Fig. 6.9. Bottom view of SPIDA with 3 director elements and PP container.

When the materials with high permittivity to be used are fluids, particular attention has to be pay to waterproof the system in order to block the fluid inlets.

In the following figures, the process to construct this antenna is shown.

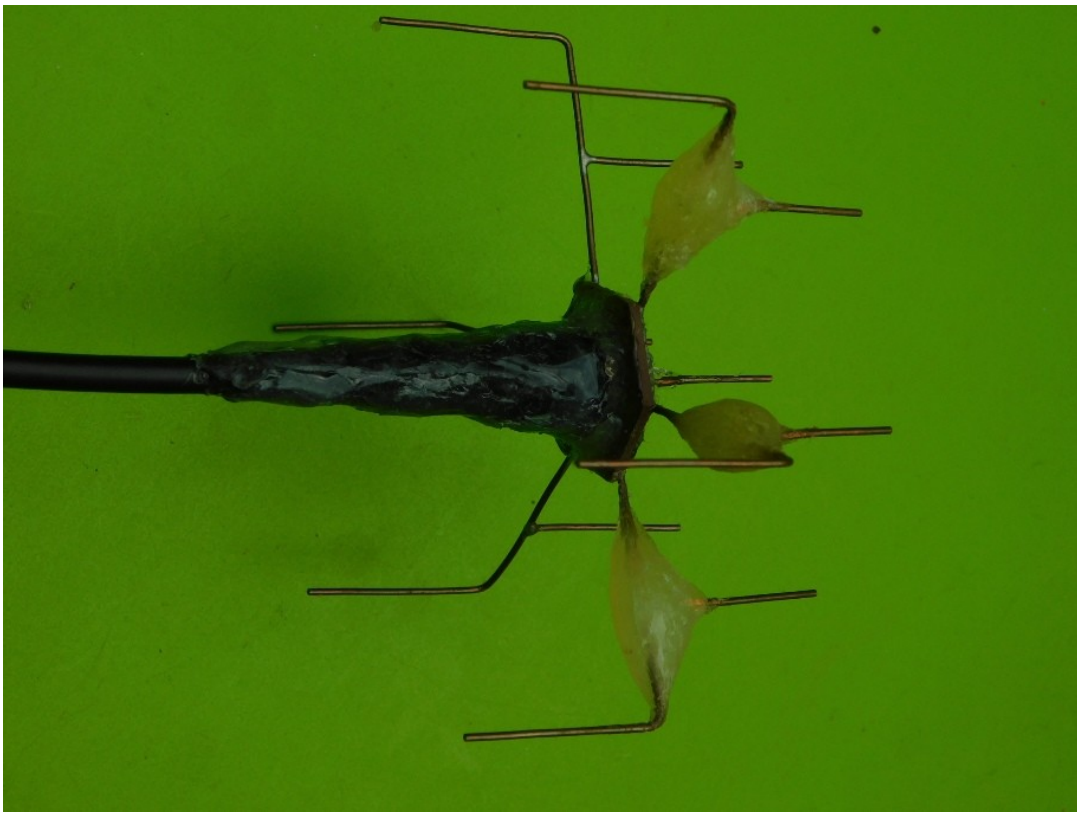

Fig. 6.10. Making the antenna water proof bottom view (with heat shrink tape and silicone).

Fig. 6.11. Making the antenna water proof front view.

Fig. 6.12. View of the container for the high permittivity materials.

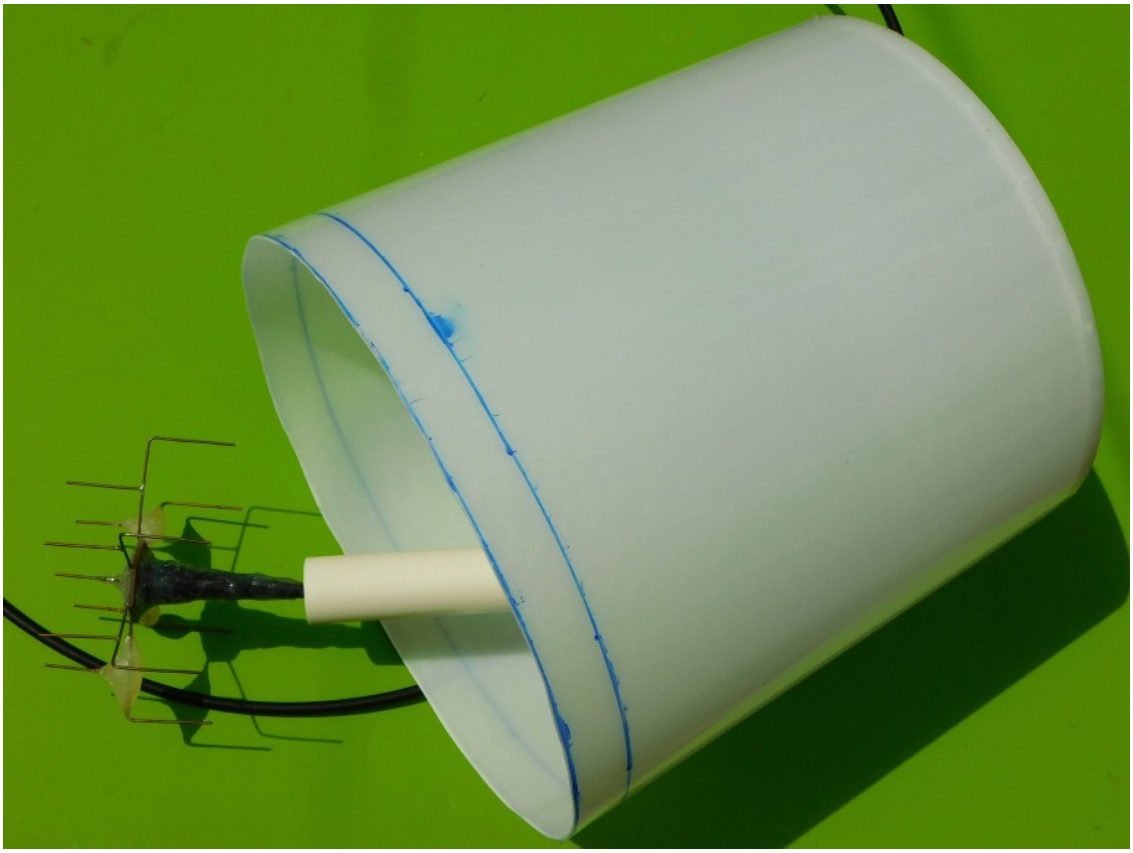

Fig. 6.13. View of the whole system before fixing all the elements in place.

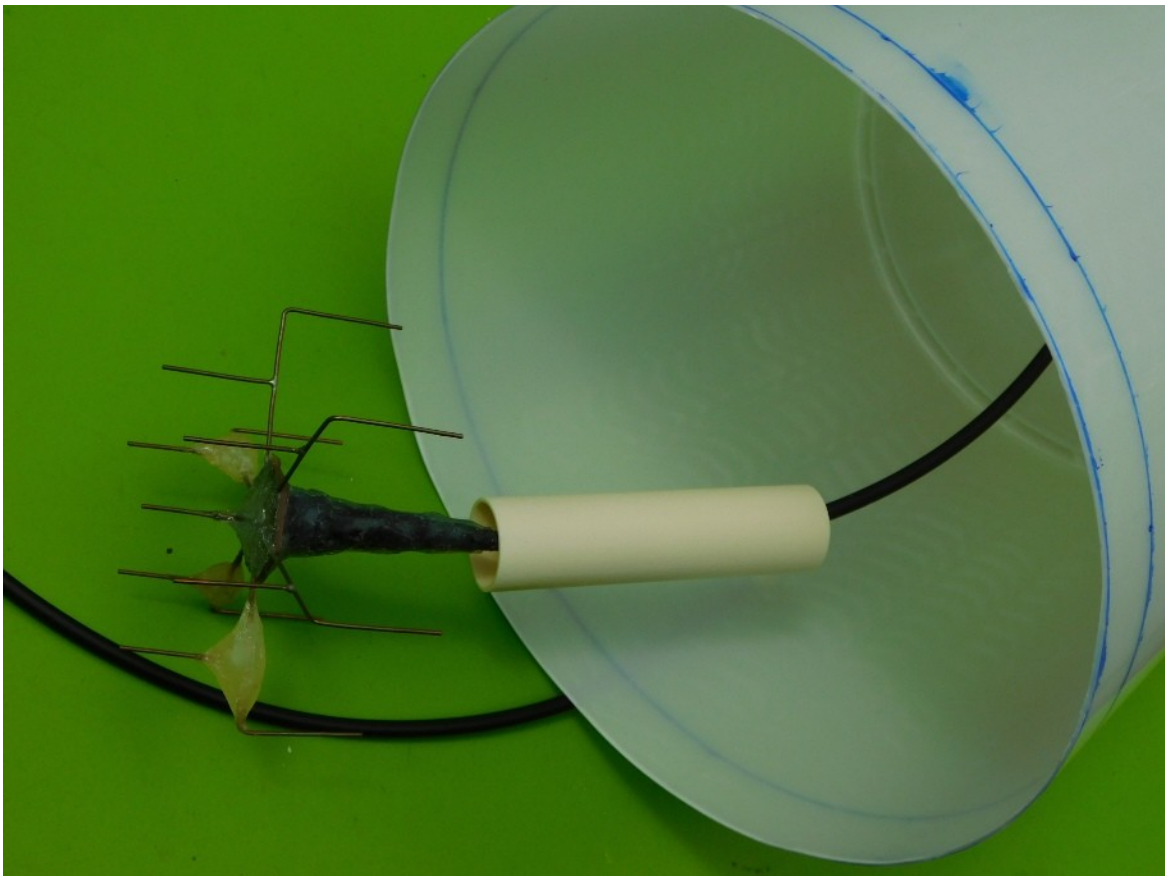

Fig. 6.14. Closer view of the whole system before fixing all the elements in place.

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