Executive Summary

High Voltage is a very dangerous phenomenon but it definitely has its benefits. However testing and designing with high voltage devices without proper training are extremely dangerous. When dealing with high voltage equipment you must be aware of voltage and current characteristics.
**Introduction**

There are several different definitions for what defines "High Voltage": Depending on which application is being discussed, High Voltage may be a number anywhere from just a couple of volts all the way to several Kilovolts. High Voltages can be used for a number of things: X-Ray generation, particle accelerators, LASERs, electromagnetic weapons, special effects, electrostatic cleaners, ozone generation, and so forth. One of the more current popular uses of high voltage testing is done with the Tesla coil. However when dealing with high voltage equipment i would like to lastly touch bases on high voltage safety and the HV suit.

High voltage

High voltages are typically electrical energies at voltages high enough to inflict bodily harm or even death upon living organisms. However if handling high voltages properly they become extremely useful to our existence as a hole. High voltage equipment such as transformers, power lines, and high voltage testing procedures help power our energy companies which in the long run provides us with unlimited opportunities of growth.

However when dealing with high voltages without proper safety one can end severely injured.
The above photo is a photo of a victim who has been burned severely from high voltage currents. When dealing with high voltages one wants to be sure that he or she are following proper HV PROCEDURES and even using some popular techniques. These techniques include things such as holding your left arm behind your back when dealing with some equipment. This is very beneficial because in case you were to get shocked the current won't pass through your heart then to the ground. Another technique would be to tie the straps of your high voltage suit together and keep a grounding rod handy. When dealing with HV you should always handle things with caution

**Tesla coil**

The Tesla coil was built by Nikola Tesla and was some of his most famous work. A tesla coil is a high-frequency air-core transformer. It takes the output from a 120vAC to several kilovolt transformer & driver circuit and steps it up to an extremely high voltage. Voltages can get to be well above 1,000,000 volts and are discharged in the form of electrical arcs. Tesla himself got arcs up to 100,000,000 volts, but to my knowledge no one has done it since him. Tesla coils are unique in the fact that they create extremely powerful electrical fields. Large coils have been known to wirelessly light up florescent lights up to 50 feet away, and because of the fact that it is an electric field that goes directly into the light and doesn't use the electrodes; even burned-out florescent lights will glow.
All though tesla coils can be considered dangerous the less voltage they are built at will be more safe. However through research I have found a few projects of mid size tesla coils being built. The one on the popular instructables website is the one that I chose to share here in my AN. This mid size tesla coil can produce about 9Kv with a 30 mA current. It is made from the following material:

Secondary Coil:

- A length of 1.5" PVC (the longer the better)
- About 300 feet of 24 AWG copper enameled wire
- 1.5" PVC screw-thing (see picture)
- 1.5" metal floor flange with threads
- Spray on enamel
- Circular, smooth metallic object for the discharge terminal

Base and Supra-base

- Various pieces of wood
- Long bolts, nuts, and washers

Primary Coil:

- About 10 feet of thin copper tubing

Capacitors:

- 6 Glass bottles (Snapple bottles work well)
- Table Salt
- Oil (I used canola. Mineral oil (horse laxative) it preferable as it doesn't mold, but I didn't have any.)
- Lots of aluminum foil
When dealing with a Tesla coil this small compared to others you won’t need a HV suit however you will want to take proper pre-cautious because this home made tesla coil can deliver a big enough voltage to stop your heart.

**High Voltage Suit**

HV suits are necessary when dealing with equipment that operates at extremely high voltages. These specially crafted suits are used to prevent any bodily harm the current. Made from Nomex aramid flame resistant fiber & micro stainless steel fibers. This suit is composed of four major components, the hood and helmet, jacket, pants and boots.

**Conclusion**

High voltage equipment and testing can be extremely life threatening if one isn’t properly trained on how to handle voltages at these levels. The development of such high voltage equipment can take days or even years to build however they are durable and if used properly can help power entire neighborhoods. However when working HV equipment being properly dressed is a major safety factor because some clothing material may be more conductive then the
next resulting in unwanted electrical arch’s. Therefore be sure to research the range of voltages you are working with so you can be sure to have the proper HV suit.
References

- http://m.instructables.com/id/How-to-build-a-Tesla-Coil/
- C.L._Wadhwa_High_voltage_engineering__2006.pdf