

System Failure

Electrical-system failure is a very commonly misused phrase that almost always actually refers to alternator or voltage-regulator failure. In such cases, what happens is the alternator is no longer capable of providing electricity to the electrical system and the battery takes charge. The electrical system still functions, but at the cost of an ever-discharging battery. There is no way to recharge the battery, and if the situation continues long enough a real electrical-system failure may occur. Actual instances of total electrical system-failures are almost nonexistent.

By way of introduction to the subject of alternator failure, I used to ask my university ground school classes to tell me what they felt the average pilot thinks about alternator failure. There would usually be at least one student who would quickly respond, "They know it's not a problem on day-VFR flights." The observation was good; unfortunately, the premise was not.

Contrary to popular belief, all in-flight alternator failures are bad. I will agree there are degrees of bad, and probably the worst condition would be night IFR flight in icing conditions, but day VFR also can present some sticky situations. Besides avionics equipment, there are landing gear and flaps to consider. True, you can usually manually extend the gear, but what happens if you have to go around and there is no power to retract? Night flight presents another major problem—the simple challenge of being able to see whatever instruments still happen to be working, for instance.

I had an instrument student who was of the opinion that if the lights went out in flight, he would simply hold his flashlight in his mouth. While on a dual flight one night, I turned off the battery master and informed him that he had "lost" the electrical system. Smugly, he reached over and pulled a flashlight out of his flight bag. It was one of those nice, big, bright, ribbed chrome types. It just barely fit in his mouth, took about one minute to make his jaws ache, three minutes to make his head stoop, almost knocked out a tooth when we hit a little bit of turbulence, and the light intensity was blinding as it reflected off the instruments and windshield. Could you imagine doing that for an hour or two? So much for holding a flashlight in your mouth.

The simple truth, which all pilots must be willing to face, is you have to be prepared for the possibility of alternator failure. What makes this failure such a problem is the electrical system continues to operate normally as if nothing had happened. When the alternator fails, the battery immediately takes over the power requirements of the system. Due to the failure of the alternator, the battery cannot get recharged, so any electrical demand will cause the battery to discharge. The greater the demand, the faster the battery will become exhausted. The trick is to identify the problem immediately, while the battery is still fully charged, so you can assure sufficient power for the remainder of the flight. That's sometimes easier said than done. If the electrical system itself doesn't show any change initially, how does a pilot know when an alternator failure occurs?

Alternator Troubleshooting

The prime source of information regarding alternator failure is the ammeter; the telltale indication depends on which of the two types you have in the airplane. As I said earlier,