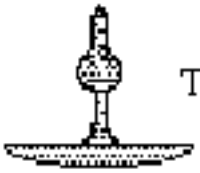
"JUST A LITTLE TRIP AROUND THE PATCH"

THE GAS CAP STORY:

[Recommendations] [Addendum 1] [Addendum 2]

Submitted by: Neal F. Wright



THE CULPRIT, THE SILICONE VALVE

One of our Cessna 120/140 club members and an associate had the exciting and traditional "moment of terror" in his Cessna 140; the scary event led to an altitude loss which permitted the passenger to scan the ratings on the transformers of the power poles, just before they were apparently being forced to land in the street by a sudden power loss. The plane, fully fueled, and going for its first flight after an electronics addition at a remote foothill airport, was being flown off a field which had a cliff at the end, with the town below some several hundreds of feet. Just off the end of the runway, near the edge of the cliff, the engine quit and a descent toward the streets of the town below was started because there was no other place to go. After the pilot did all the recommended things, the engine caught just above the power poles along the streets, a climb was made, and a safe landing from a very high downwind was a quick "next".

After landing, the distraught FBO who had done the electronics modification met the plane as it taxied in since he had been delightedly observing the plane, had heard the engine stop, and had, with horror, noted the quick sink toward the town below. Knowing that stopped engines often mean fuel starvation, the FBO hopped up on a stepladder after the plane returned and stopped. He removed the gas caps in turn and when the new half-vented gas cap on the right tank was removed, a moaning sigh was apparent to all the bystanders------the tank apparently had not been vented during the exciting half of the flight and a vacuum developed as the fuel was used until there was more vacuum suck in the tank than the hydraulic head of fuel could overcome. Fortunately, there was only one of the new half-vented gas caps on the plane and the emergency switchover to the normally--vented tank allowed full fuel flow and recovery before the lower elevation landing that seemed so imminent only lifetime-long moments before.

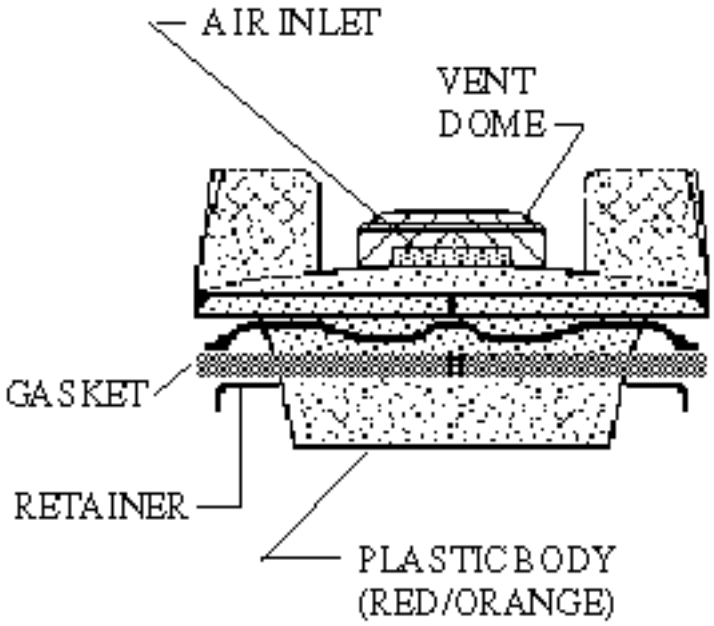
The new half-vented cap had been a mandated addition at the recent annual, supposedly to comply with the airworthiness directive 79-10-14 r1. The big town prominent and well-paid FBO AI had been adamant....buy the new gas cap and install it or we won't sign off the plane! What the "expert" missed was that the cap should only be used on 140A and subsequent Cessna's, not on the older 120's and 140's. Upon inspection of the cap, it was noted that the red silicone "valve" of the new-style gas cap had adhered to its seat and had not allowed any air to flow into the tank. The red silicone valve of the gas cap should not have sealed to its seat, but it did. Not surprisingly, the fury of the owner and the foothill FBO after the event was aimed at both the failure of the gas cap and at the aircraft inspector/FBO at the home field who had refused to sign off the recent annual until that airworthiness directive (A/D....I am going to use A/D to mean airworthiness directive since "AD" is easily confused with the ad of advertisement) had been complied with. The owner had not been aware of the specifics of the airworthiness directive, but who was he to argue with an accredited aircraft inspector, one who is supposed to know what A/D belongs to what airplane, one who received prime pay to be correct? This time, the airworthiness inspector (AI) was wrong, and he misapplied the A/D, turning aside the plea that a Cessna 140A is a

different beast than the owner's early ‘46 Cessna 140, and that, perhaps, the A/D did not apply. Since there was no admonishment in the A/D or with the gas cap manufacturer's literature (there may not have been any) about not using the caps on other types of planes, nor any limiting legend on the cap or on its packaging, these participants weren't the first or the last to be misled, misled to set up a condition which could have been a catastrophe, though not for the misinformed AI or the people who wrote the A/D or the maker of the new cap.

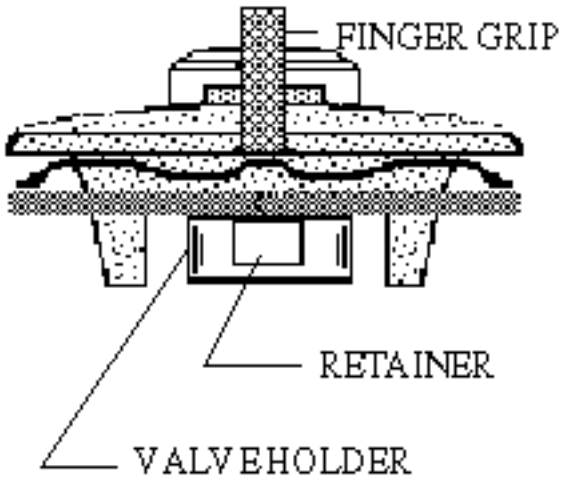
Every time this event of loss of power and the quick descent is discussed, someone mentions that if the plane had landed or crashed in the street, it would have been another accident totted up to "pilot error" because, by the time the FAA/NTSB fellows did their thing, the stuck tank would have been vented by being "bent-vented" by a tree trunk.

For a long time, we considered writing a note about the hazard, but to whom and to say what? If one-on-one verbal explanations are incapable of making other owners take remedial action when their 120/140 Cessnas were seen to be using the half-vented caps, and they seem to be, then would a note like this create corrective action if printed in a respected publication? (It appeared in full in one of the International Cessna 120/140 Club Newsletters and helped some for sure.) This note, with figures, went to all the clubs, including Cessna Pilot's Association, the EAA, the AOPA, and the "big club", the FAA, but it is written mostly for the Cessna 120/140 club newsletters since they reach more of the owners of these types of planes than any of the other publications except for an airworthiness directive. Since so many planes of other brands built at the period ours shared common small parts like gas caps, it seems likely that other types of planes may now have the same potential for stoppages if the owners have purchased the half-vented caps without knowing their hidden dangers. The recent increase of concern was brought on by our seeing more and more of our club 120 and 140 planes showing up with one or two of the half-vented gas cap(s). The users are unaware of the hazards of them when used on the wrong plane types, since no documentation limits their use and the manufacturer provides no warning about them. When we non--accredited types mentioned to the owners with the wrong caps that the adaptation might be a hazard, we sometimes got looks that varied between sweet disinterest and disdain—as though someone could possibly get in trouble with a brand new Cessna-dealer-furnished gas cap that sells for a magnificent $40 and is bright red? How could anything like that hurt someone??? Follow the story and decide for yourself. And yes, even the Cessna dealers will sell you the wrong caps because they all know that "all those little planes are the same".

The text refers to a "half-vented" gas cap though that term will not be found elsewhere; I use that name because that is what it does and no other name so descriptive has appeared in the research. It is "half-vented" in that it allows air inflow to the tank, but prevents any outflow of air or fumes or even fuel if it expands from heat. It is a nicely designed unit, looks good, and appears as something like this:



A side view of the half-vented tank cap, the style mandated for the 140A and newer/larger Cessna's in order to provide an alternate source of tank venting in the event the original primary external vent became clogged.



A rotated view of the half-vented tank cap. The cap is nicely made, but the manufacturer must be ashamed of it since it has not a single marking denoting the name of the maker or the city in which it was made nor even a part number.

Why, you may ask, was the gas cap designed to be one-way or half-vented? Recall that the 140A and later Cessnas have three features which our older planes lacked: 1) a forward-facing common tank vent on top of the wing, 2) a juncture of this common vent to a tube running between tanks to allow sharing the common vent (the last-made 120's and 140's which preceeded the 140A's had the tank-to-tank vent line added but no external inlet), plus 3) non-vented gas caps on both tanks. On those planes with the single common vent, vent blockages occurred, fuel stoppages occurred, and that lead to the airworthiness directive for the Cessna planes starting with the 140A. The single inlet blockages were probably caused by a wasp nest or a snow plug or an ice plug in the new, shared, single vent opening. The airworthiness directive mentioned that systems with a fuel vent valve could stick and cause the same problem (on the bigger planes). To avoid the problem, the single A/D-mandated half-vented cap would provide an alternate vent inlet.

One of the things not well researched or understood is how much fuel can be drained and used before the engine stops if the common vent were plugged. Often, there would be enough fuel to the engine to initiate flight before the vacuum in the tanks prevented further

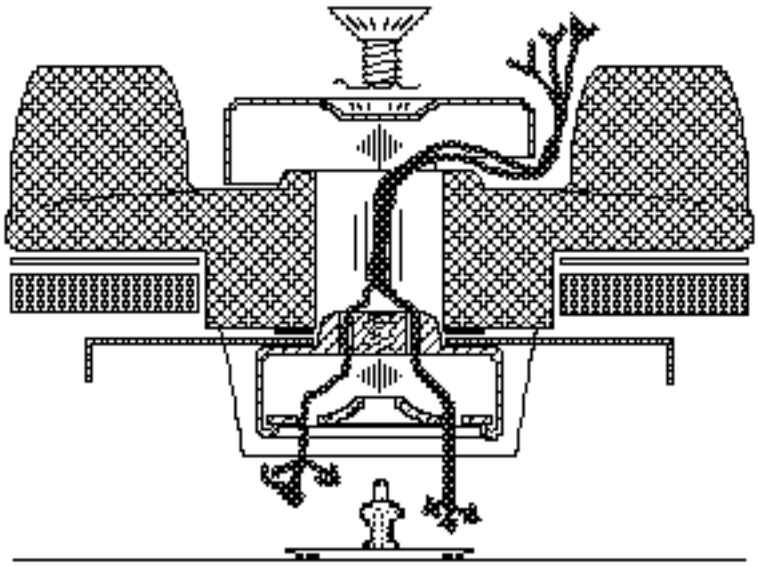
flow (I have tried to figure out what this value would be, but have been thwarted by not knowing what partial pressures the fuel contributes by evaporation as the fuel is drained). Properly used on the designated planes, the cure mandated by the A/D and solved by the STC'ed half-vented gas cap will be apparent------the new cap(s) would provide an alternate path for venting inflow of air even if the common external vent has a stoppage. Mandating only one new cap instead of two was based on the premise that, if one blockage was possible but unlikely, then two vents (the new half-vent cap and the original common vent) would surely make a blockage statistically impossible. They could not have reverted to using the fully-vented gas caps used on our 120/140's because the old caps would have been a half-cure and a half new problem. The old full-vented style would certainly let air in as required, just as they do on our planes, but when the common forward-facing external vent is working properly as on the 140A, the old style caps also would have allowed fuel to flow out through the fully vented tank cap because the common vent acts just like the pitot tube--------it catches the air and that air is converted to pressure. Pressure inside a full tank having the old-style full-vented cap would force some of the fuel overboard from the full tank of the low wing. So, there needed to be a new cap for the 140A's and other Cessnas, one that would allow air in, but would prevent fuel or fumes from getting out of the tanks. That is the reason for the half-vented cap and it does its job very well, as long as the silicone-based valve does not get sealed to the cap (there is no warning with the new caps to alert the user to periodically replace the silicone seal) or so long as the cap is not used on the wrong airplanes!!

The problem outlined here is not a complaint of poor design, but rather of the misapplication of the half-vented caps. The mandated caps were properly designed to solve the problem given-----but their difference means they should not be used on planes without the common external vent and vent interconnect tube. They should not be used on airplanes such as our Cessna 120/140's which depend on full-vented caps.

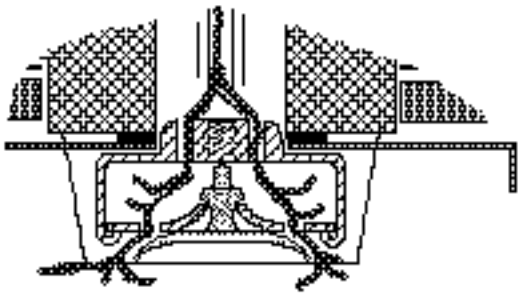
The airworthiness directive 79-10-14 r1 states (paraphrased) "....To provide an alternate source of fuel tank venting in case of....vent obstruction by foreign material and/or sticking of the fuel vent valve.....This can be accomplished by the vented fuel caps or other approved methods (none listed)....." And then the A/D lists STC's and contacts for the new caps. Note that the A/D calls the new caps "vented fuel caps" as though they are full-vented. There is no diagram showing the vent systems, either before or after the modification. The airworthiness directive was written without the authors anticipating that like-airplane owners might misuse the new caps, and it has no sketches of systems, perhaps because it covers so many airplane models, starting with the 140A and continuing to list nearly every other gasoline--burning Cessna built since the 140A. Longtime 120/140/140A owners understand that one difference in the Cessna 140A model planes and the 120/140 models is that most 120/140's came with and must have two full-vented gas caps even if they are of the group made with the tank vent interconnect. The 140A models came with non-vented gas caps, an overwing shared vent, and a vent tube interconnecting the vent and both tanks. The airworthiness directive mandated one half-vented gas cap for every Cessna which had a shared external fuel vent, plus a tube which interconnected tanks. The purpose of the half-vented gas cap was to allow air to enter the tank to which it was attached in the event of a failure of the central external vent (because of the interconnected vent tube, the new cap could be put on either tank and was deemed not necessary on both). In hindsight, based on the misuse of the half-venting caps, it is unfortunate that the A/D did not note the "half-vent" feature, it did not show a system, and it contained no admonishments about not using the gas cap for a type of system which was not made for it and could be vent-strangled by it. To complicate matters, Cessna deleted the part number for the through-hole vented caps like ours and if the dealer does not refer to the factory for the replacement, then there is now only the half-vented cap listed in their outdated documentation.

Now do you see the trap? It is made up of three things: a) the new mandated gas caps were half-vented, which means that they will let air in, given that the valve in them is faultless, *but they will not let air or fumes or expanding fuel out, one of those "little' things it fails to mention;* b) the gas caps are supposed to be used only on the 140A's of our group, plus all

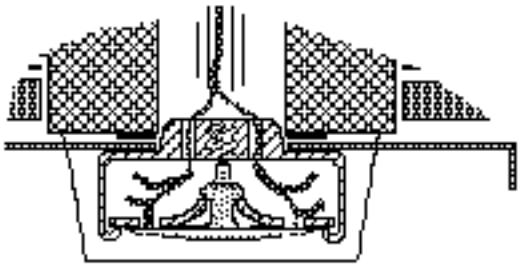
other Cessnas that have a common fuel vent, but that was not made crystal clear either by the A/D or the manufacturer of the cap or the STC for the caps or the distributors and dealers; and c) club members are unaware of the hazard so they blithely assume the new caps must be better than the old ones, and, if they are good for the 140A's, they must therefore be good for the 120's and the 140's!!!!!!



A fully sectioned gas cap, showing the silicone valve displaced to better depict the flow and path of the incoming air.



The important portion of the cap showing the silicone valve open to let the outside air into the tank. Note that the silicone valve is shown as though it had two wings, whereas it is really round and would appear more as shown in a later sketch.

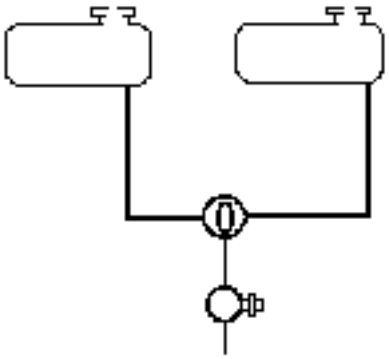


The same view, but with the silicone valve in the closed position, as it would be if the pressure on the tank side is the same or greater than the pressure outside the tank. The airflow, of course, is shown halted. Not only fumes can't get out, but fuel can't get out if it happens to expand from being heated by the sun. If the pilot takes off using the left tank, and if the right tank has the half-vent cap, then there is a hazard, too, if the pressure builds up as the altitude increases!!

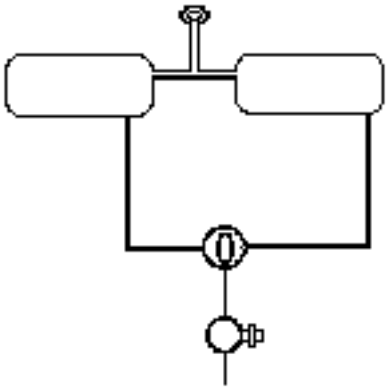
The silicone valve in a simulated and exaggerated open condition, appearing something like an umbrella that has been turned inside out by a high wind. The material and shape of the valve ensure that the valve is very pliable.

Now, if the "trap" explanation is not enough to make the 120/140 users take another look at the danger of the error made by adapting the new caps for their 120/140's, consider what happened to the member who nearly used the street for an emergency landing: a) his licensed airworthiness inspector (AI) had insisted that the half-vented caps belonged on all Cessnas, and b) his new ***blankety blank half-vented gas cap got its one-way valve stuck, preventing any*** air inlet to the takeoff tank. The pilot had a fifty-fifty chance when selecting which tank to fly that day, and maybe it was lucky the way it happened; he is a pilot who uses the fuel in a tank to the last gasp before switching over to the other tank. Consider what would have happened if he had started on the other tank, flown it until empty, and then depended upon a full, but blocked-vent tank to get him the rest of the way home. Eek!!!

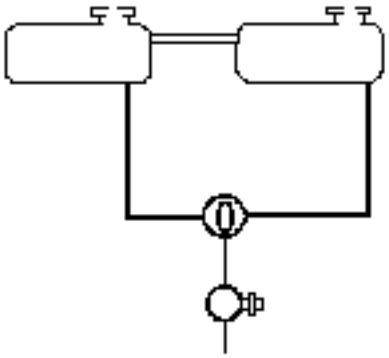
The A/D was too sketchy, or maybe un-sketchy since it has no diagrams, as though written by someone who did not really understand what he was describing or maybe there were too many variations to cover properly; so, in the sketches that follow, note the "normal" 120/140 and the "normal" 140A fuel systems and then take a look at the expected action of the half-vented gas caps. To make the systems simpler, such items as drain cocks and gas gages are not noted.



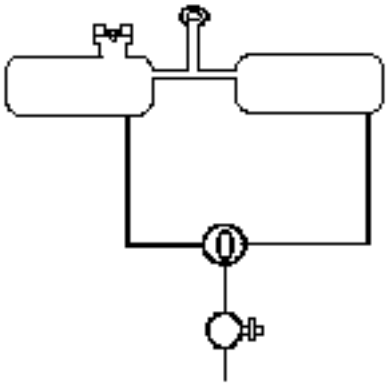
The Cessna 120 and 140 version of the fuel system, vastly simplified to show only the typical full-vented gas caps and the lack of any tank vent interconnect or external vent. Note that, if one tank inlet vent is blocked, such as was the case for the subject 140, there is no other source of inlet air to replace the volume of fuel used. Note, too, that if a tank vent is outflow blocked, there is no way for internal tank pressure from sun heating to escape; the half-vented caps are that style--------they prevent any outflow of air/fumes or even fuel and are meant to allow only inflow--------if the silicone valve doesn't stick!!!!



The "normal", as-designed Cessna 140A fuel system, again simplified and stylized to show only that there is a tank vent interconnect tube attached to the new top-of-the-wing vent. It is obvious that, if the single vent is blocked by a hornet's nest or ice, there is no way to get fuel out of either tank after a vacuum develops from fuel outflow. The gas tanks are shown as though they have no filler openings or caps, though of course they do-----part of the problem is that, starting with the 140A, the gas caps were "blind", or ventless, so the venting was totally dependent on the new, external, common vent.



Naturally, to confuse things, there is a group of 120/140's starting at serial 14004 which have the original full-vent caps plus a tank to tank vent tube. It is not shown here.



The Cessna 140A tank system shown with the mandated redundant fuel vent gas cap installed. The detail is too small to denote that the cap only allows air inflow as the fuel is used, but prevents any air or fumes or fuel from outflow in the event a full tank of fuel warms up on a hot day or if altitude-induced differential pressure is created.

In retrospect, if the airworthiness directive mandating the change to the half-vented cap had better explained the purpose of the A/D or had even mentioned that the cap had an integral valve which was designed to allow flow of air in and prevent the flow of any air or fumes or fuel outward, maybe, just maybe, some of the people now tempting fate would not have used the new-style gas caps on their planes. Blame for misapplication can be further shared, however, since there is no admonishment by the cap manufacturer about possible misuse

(and they certainly were aware of it!!!). And no warning on the caps themselves and----it won't surprise you to know----that mentions of the caps in the catalogs fail to note their limitations about being for planes only with an alternate source of venting. Another comment about the manufacturer of the part which caused this investigation is that, contrary to good business practice, there is not a hint as to their name or model number. Without any data stamped or imprinted on the caps, it is as though he was afraid or ashamed to be acknowledged.

Here is the warning from us: the intent of the half-vented gas cap is to provide an alternate source of gas tank venting *for those planes which have a common exterior vent and which have the tanks interconnected with a vent pipe*. The 140A's and most of the other Cessnas which came after are in this category, but the plain 120's and 140's are not, and they are at risk if the half-vent gas cap is used. The purpose of the half-vented gas cap is to allow external air to enter the gas tank in the event the external primary tank vent is blocked, whether by bug nest or ice. *These caps should never be used on a plane that was designed to be dependent upon the through-hole, two-way venting, individual gas caps!!!!*

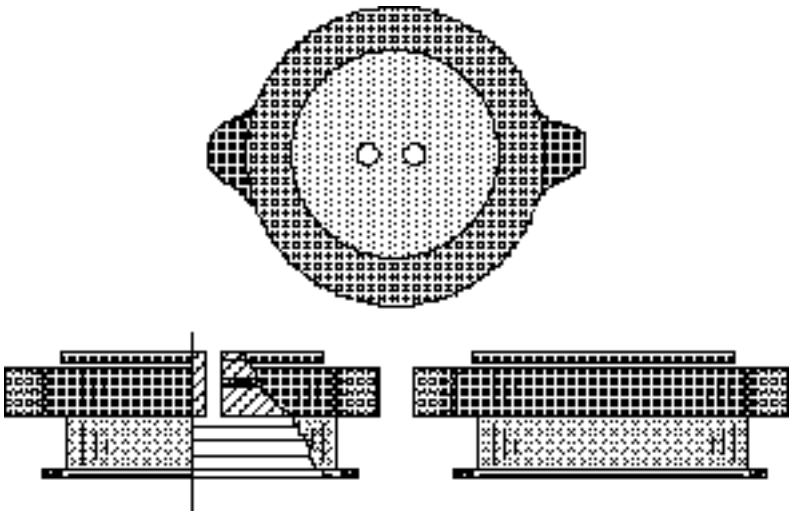
If all this explanation is not enough to convince a user of the risk, consider that the clubmember's experience of a locked/frozen/sealed silicone valve on the half-vented gas cap could easily be repeated on a plane with the right circumstances, such as a hot sun, a full tank, a long wait between flights, and some of the new fuel which smells so odd and gums so well. If the tanks on our 120's and 140's can't get air in when they need it to replace the fuel volume depleted when flying because the silicone valve sticks to its seat, then that is one hazard, and another hazard exists when the plane with the new cap is heated by the sun. With a half-vented cap installed, the effect of the force of the expansion of the fuel, and the fumes within, should be quite a sight to behold when the fumes or fuel can't get out, as would also be the case simply from altitude-induced pressure differentials. The tanks and the wings and the fuel system downstream can suffer extreme trauma from the pressure!!!!! Remember!!!! These half-vented caps are designed to only let air in.....And nothing!!!!! Out. The greater the pressure from the inside, the tighter a seal the silicone valve will make. (Since this was written, I have heard from owners who now understood why their sealed tanks bulged and/or leaked!)

If your plane is a 120 or 140 that has the new-style gas cap, and you don't want the hazard for an hour longer, but you have to get home, then you can render the half-vent caps full-vent by removing the silicone valve. For short term use, say a trip or two, the half-vented gas caps can be made safe for our 120/140's if the red silicone valve (that is what the manufacturer calls it) is pulled out, a step that can be easily accomplished; realize that a mechanic or fuel person might subsequently notice the silicone valve being missing, not know why, and re-install a new silicone valve or like cap since they are readily available at any Cessna FBO. The silicone valve itself is available for only $5.00 to $7.00 for the plastic cap model and $12 for the metal model, so beware someone doing another favor by re-installing it when you thought you had disabled the valve. If you have one or, god forbid, two half-vented caps on the wrong plane, your Cessna 120 or 140, get that valve out of there, make a note in the logs, and go back to the original gas caps with their two-way vent holes as soon as you can!! Be safe.

{This comment will be in the text twice. Changing to the cute caps with vent tubes which face forward or aft is not the correct solution, either. I f you want to know why they can do you in, ask for the article I wrote about them.}

Our Cessna 120/140 International Club maintenance advisor distributed a technical advisor note a few years ago that show the fuel systems and mentions the problems the A/D caused and also noted that one of the central states' largest parts supplier had, for a while, advertised the half-vent cap for all the models. Because of the information the advisor fed back to Wag-Aero, they changed their catalog and no longer show the cap as being universally usable. Unfortunately, not all the suppliers are aware of the hazards, and there would seem to be no way to purge them of the misinformation without a release from the

FAA; although a large proportion of the owners are members of one club or both, not all owners are, and so they would miss an alert of this risk. Note that, in the figures of the Cessna systems, there is the comment that a later block of 120/140's, starting at serial 14004, had the "normal" full vent caps, and had an added tank-to-tank fuel vent tube. For that group, the hazard of having one half-vent cap would be less than for the earlier models, but if one used two of the caps after serial 14004, then all the hazards as presented would exist. One of the airplanes near the Club tent at Oshkosh, a 140, had two half-vented caps!



The original caps for the Cessna 120's and 140's look something like this, with the two vent holes as shown providing air inflow or fume outflow without restriction. They are both-way vents since fumes can exit and air can enter without any valve interfering.

The world seems to be set up to confuse, sometimes, and Cessna proves the point; if you look in the Cessna 140A manuals, especially the "parts catalog" since it has the better figures, you will see these 120/140 fully vented caps!!! Even in the updated manuals, those that indicate they were printed long after the change to the non-vented caps was made, the "old" 120/140 caps are shown. When and how and if they ever made the change on the newest 140A manuals remains a mystery.

Recommendations? [Top of Page | Addendum 1 | Addendum 2]

These comments were included in the original writeup and were meant to prevent a recurrence. Read them with that thought in mind. I have noted those which "happened".

1. Mark the half-vent gas caps with some all-encompassing statement such as: "use only on fuel systems with existing external.....". A good thought, but it soon becomes obvious that there won't be enough room on the cap for all the necessary information.

2. Recall the gas caps on the shelf and make it mandatory that they be individually packaged, with the limits of usage spelled out on the package and prominently displayed on the documentation inside each package.

3. Submit the information to the FAA for their review and possible re-issue of an amended airworthiness directive. The A/D, for Cessna, should mention the 120 and 140 this time, noting that the half-vented types should not be used on them.

4. Have Cessna release service notes with the hazards listed. (Cessna told me, after they evaluated this note, that they were going to do just this, but never did and I don't know why.....maybe they saw a liability in acknowledging the half-vented caps could be misused?)

5. Have Cessna list the planes which can be used with the particular gas caps. (right now, I believe that Cessna lists only the half-vented gas gap, without any reference to the required full-vent type).

6. Have the clubs, the Cessna 120/140 West Coast and the Cessna 120/140 International especially, distribute an alert in their newsletters. (The International Club printed this complete note, and they printed the note from the Cessna person responsible at that time, Mr. Boyarski, and they printed the note about the hazard when it was found that a national cap supplier was unaware of the risk.)

7. Have organizations such as Cessnapa, AOPA, and EAA print an alert about the hazard.

8. Read all the gas cap STC's and determine if they should be amended with a caution note.

Further investigations?

1. Determine if the Cessna 120/140 planes are the only types to require the full-vent caps (I suspect that other small planes like ours will be affected, too).

2. Especially determine if some of the Cessna 170 planes have systems like the 120/140's.

3. Survey Cessna owners and find out how many have had the silicone valve sticking problem. From that, determine if the half-vent caps should be obsoleted.

References:

Airworthiness directive: 79-10-14 r1 as amended 30 may, 1988.
Cessna half-vent gas cap part number: c156003-0101
Cessna full-vent gas cap part number: it was 0422109-1 but suspect there is none today. (Actually, they superseded the old part number and the new number, Made To Order only is c156003--0101 per the note from
Mr Boyarski of Cessna in his letter which appeared in the International Club Newsletter.)
Cessna half-vent gas cap replacement silicone valve part number: unknown
Manufacturer of the half-vented gas cap: C.A.P. Of Wichita KS (no listing phone or address)
Manufacturer of the half-vented gas cap which caused the problem? Not marked in any fashion, perhaps traceable only by way of the STC or Cessna.

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Addendum 1: [Top of Page | Recommendations | Addendum 2]

When I went to the only local Cessna dealer in the area and asked if they had any gas caps like the one that caused all the problems, they brought out a whole bunch, neatly bagged from the last inventory. These had a shape similar, though not identical, to the one that we are using as the model, but they include the familiar silicone valve. For the first time, there was a vendor name on the caps, though no boxes: C.A.P. Inc., Of Wichita, KS. It seemed odd that they were not individually boxed, especially when one considers that the value placed on these was the highest so far-----$42.50. I later tried to find the C.A.P. Company in the Wichita phone book, but had no luck with it or with the Wichita operator since there was no listing. I never did locate them.

When I asked if the caps they had could be used on the Cessna 120/140's, the Cessna dealer's clerk was firm and quick with the response that they could be; the mechanic who was being kind enough to show them to me took her word for it so it became an "absolute". I

can understand how this would be a natural conclusion; they are mandatory via an airworthiness directive for nearly every gas-burning Cessna since 1946 except the 120/140's (the airworthiness directive does not state the exclusions, remember). Since I do not have access to a Cessna parts list, I have no idea if there are Cessna listings for the "old" cap with the straight-through holes for the vent, and "new" listings for this problem cap.

There is no documentation with the gas caps from Cessna (that is really a guess at this point) or from the maker and there is nothing imprinted on them to suggest that a user could get in trouble if the caps were to be used on non-common-vent planes. Because there is no box, the "last chance" to signify the danger of mis-application is lost.

The Cessna part number of the cap according to the documentation of the Cessna dealer is c156003--0101, and that number sufficed for the distributor to look up, so it is probably correct.

When I tried to chase the gas caps and the "C.A.P." Manufacturer, or any other, through the only aircraft parts distributor left in the area, their shelves were empty of the parts, and there was no reference to any manufacturer, and so another dead end.

One of the mailorder gas cap suppliers lists his "metal- vented cap" as being for 120, 140, 150, 152, 172. Does that sound like the trap? Does to me. I have requested information from them. (This source, after my note was input to the International Club, was advised by the International Club Technical Advisor of the problem and the vendor stopped the advertisement.)

Data:

0422009-1 is the original correct part number for the 120/140's cap, since superseded by C100084-5 (which is the made-to-order part).
0311360-4 is the original part number of the cap for the 140A, but microfiche says go to C156003--0101, the part number of the half-vent cap.
At Sacramento, the lookup for the cap for the 120's found that it was a MTO (made to order) part per Cessna. They had a cap in stock, for $11.40 or so.
The Cessna dealer at Concord looked up the caps and found it to be a MTO item, contacted Cessna, and found that it would take about six weeks and that its cost was now $85.xx.
The Cessna dealer in San Carlos will sell you a cap for the 140A for use on the 120/140's!!!!!
Nothing will convince her she is wrong, though the promised Cessna service letter might.
Monarch Air & Development, Inc. of Oakland, OR, 97462, is one of the makers who claims to have caps for the planes, but I could never establish whether they were one-way or two-way in letters to the owner.

Addendum 2: [Top of Page | Recommendations | Addendum 1]

Updated March 1998 because the use of the "wrong" cap seems to be proliferating again. A note of suggestion in a response to a query about them by an Internet Web site reader triggered this re-issue. He suggested that the new style cap with the rubber valve in it would work just fine, without realizing or mentioning that some types could kill you or make your tank bloat in the hot sun.

At Oshkosh in '95, three of the Cessna 120/140's in the display area near the club tent had one or both of the caps changed to the type that could cause great grief to the owners. It is disheartening that some of the owners don't want to know about the caps because, so far: "...haven't had a problem yet...". If there were an accident caused by the half-vented caps, they would be faulted of course, not the FAA for a flawed and confusing AD, not the cap maker because they were blessed, and not..... Fortunately, there are those who do appreciate the information and change back to the fully vented style caps.

1. Since writing the story, it has appeared in the Cessna 120/140 International

Club Newsletter, thanks to Bill Rhoades. Issue 224.

2. Mr. Patrick W. Boyarski of Cessna, having read the article, wrote a letter to the club restating the hazards I present here and recommending that all check. Issue 178 of the International Cessna 120/140 newsletter. Mr. Boyarski is now the CEO of Cessna.

> Cessna, in their response to me, explained that they intended to issue a service letter to all dealers that was to go out "soon". As far as I know, that never happened and I don't know why. Recall that this endeavor took place during the period when, to admit something wrong would induce a lawsuit, and maybe.....

3. I never received so much as an acknowledgement from the AOPA (lets see....they talk about safety, don't they? Sometimes? Only when their in-house authors write the story? Only for the biggees?).

4. I never received an acknowledgement from the EAA, a disappointment since they do such a good job about passing along helpful information. Why they skipped this one is baffling in light of the number of old planes which use the through-hole cap and which might be at risk through "adaptation" of the available half-vented type. There seems to be no way to "get through" the infinite barrier against non-staff writers.

5. There was no response from the FAA and they have never issued a follow-up to the AD.

6. There has been no response from the NTSB.

Several times, in the 120/140 Newsletter and in an old West Coast 120/140 club newsletter, it has been mentioned that, if you want to keep rainwater out of the tank, put a tuna can over each cap. In the tips section of the Cessna140.com Web site, this tip is restated by Bill Rhoades, and it is a good one. If you forget them (none of us will, of course), the air flow at takeoff will remove them for you; or tie them to your chocks or control locks. {I can't help this....picture a runway after a 120/140 meet littered with tuna cans.....what would the non-knowing who saw them think...a cat convention?}

Alternatively, in a recent note, another member mentions that he has used the "rubber" part of a plumbing plunger, without handle, in the same manner. With one of Bruce's fuselage covers, there won't be any rainwater to get in because the two flanges of the cover which go over the top of the plane cover the caps as well...neat. I used to have a few drops after every rain when without the cover; since, with Bruce's cover, I never see any water in the fuel when draining before flight.

Note that, if you have one of the newer planes with the "both" position on your fuel selector, and if you have one of the half-vented caps installed on which the neoprene valve "locks" such as to allow no inlet, several other odd events could occur.

Not mentioned in the original story but out there somewhere on a plane which has been incorrectly converted to the half-vented caps will be another event wherein the tank (s) is pressurized when heated in the sun. If your fuel valve is off and seep-free, the tank will withstand the pressure until it bulges or finds a weak spot as already evidenced by one member. If the fuel valve is on to that now-pressurized tank, it is conceivable that the excess pressure could overcome the shutoff valve of the float in the carburetor, leading to overflow through the carburetor or an excessively rich mixture.

Odd things happen when the wrong parts are used, a lesson we learn over and over. Use the correct caps, based on the model of plane, and don't believe, just because a vendor or even a Cessna dealer sells you the half-vented type that it "must be okay".

(This comment will be in the text twice. Changing to the cute caps with vent tubes which face forward or aft is not the correct solution, either. If you want to know why they can do you in, ask for the article I wrote about them to find the answers.)

My choice, if I lost the existing caps? Find the guy who makes the caps with the little metal "rain hat" over the holes.

Direct all comments and inquries about this article to:

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