REGULATION OF HUMAN FACTORS

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I. Introduction

REGULATIONS defining the medical fitness of pilots have been in effect since the 1920's. No one doubts the necessity of these regulations, but before any regulation can accomplish the desired purpose it must be applied as it is written. The regulations include the federal regulations applied to the pilot and controller, and the internal regulations promulgated by the airlines and applied to the pilot by the company medical office. These medical regulations are often applied in a biased and unequal fashion, at the whim of the individual examiner and to suit the individual examiner's purpose.

Whether the biased interpretation of the regulations by the given individual is overly strict or negligently lax, the purpose of the regulations is subverted, and the parties meant to benefit by the regulations will suffer. Parties include not only the monolithic airlines and federal government, but also the pilot, controller and passenger. The exact nature of the misapplication of the regulations at all levels will be discussed throughout this paper. At this juncture it is sufficient to state that such bias exists.

II. The Regulations Promulgated

There are three sets of regulations in existence: those promulgated by the federal government affecting all pilots, controllers and passengers; the regulations promulgated by the individual airline for its staff and passengers; and the regulatory system that each of us imposes upon ourselves. The latter may be the most important.

The federal regulations, which can have the greatest effect on the aviation industry, are certainly less stringent when compared with the regulations promulgated and enforced by the individual airlines. These regulations apply to the population as a whole, and while they are divided into separate categories for the private pilot, for the commercial non-passerger flying pilot and for the commercial pilot, the standards cannot be so stringent that only a select few could fly. If that were the case the airlines would not have a sufficient number of qualified men who could be trained to fly. On the other hand, if the federal regulations were so lax that any individual could fly, the airline and industry would not have any problem of supply, but the class of private pilots would include many unqualified and unfit airmen. The federal government has attempted to steer a middle course.

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1 14 C.F.R., Et seq. (1967).
The first complete set of federal regulations, known as the Air Commerce Regulations, were generally vague. Appearing as section 51 they were divided into four categories: Private Pilots, Industrial Pilots, Limited Commercial Pilots, and Transport Pilots.

The regulations for the Transport Pilots were simply: "[G]ood past history; sound pulmonary, cardiovascular, gastrointestinal, central nervous and genito-urinary systems; freedom from material structural defects or limitations; freedom from disease of the ductless glands; normal central, peripheral, and color vision, normal judgment of distance; only slight defects of ocular muscle balance; freedom from ocular disease; absence of obstructive or diseased conditions of the ear, nose, and throat; no abnormalities of equilibrium that would interfere with flying." These regulatory guidelines would cause no trouble to the examining physician if he were faced with a perfect human specimen. However, problems would arise if the slightest defect were present. If a physician interpreted the regulations strictly, few men would qualify, while another physician interpreting the regulations broadly might give a medical certificate to an individual a colleague had disqualified.

Because of the many conflicts in interpretation, the CAA and then the FAA attempted to limit the areas in which dispute could arise. Where possible, actual measures were inserted and specific tests standardized in the hope that the same results would be achieved no matter who was giving the examination. These changes were first seen in the regulations promulgated in 1938 and in the publication, for physicians only, the Guide for Aviation Medical Examiners.

The Guide for Aviation Medical Examiners is not a part of the official regulations and therefore is not law. However, being distributed to every medical examiner, its contents will have an effect on the manner in which the regulations are applied. The Guide informs the physician how to fill out the forms and provides a copy of the regulations. In addition, the Guide instructs him as to which tests are to be performed and how to interpret the results of the tests when performed. The value of the Guide may be questioned when it leaves the realm of how to do a test and enters the realm of what medical conditions are included under the headings of the regulations. If the pilot has a medical condition that should be disqualifying, then there is no reason for the name of the condition to appear solely in the Guide. It should appear in the regulations. I do not wish to take great issue with the Guide, as I do believe that it plays an important function in the proper administration of the regulations. However, it should be stressed that in the hands of physicians the wording of the Guide may be used in place of the regulations. This should not be the case.

The regulations formulated by airline medical departments present an entirely different problem. The airline cannot be concerned with the physical condition of the individual over the next six months, the next year, or the next two years. Rather, the question is will the given individual be able to perform over the next twenty or thirty years? A large sum of money is spent in training a pilot, and if it could be determined that an
individual could not complete a long period of employment, then it would be wasteful to hire the man for a short period of time. Therefore, the airline regulations are usually stricter than the federal regulations and the examinations usually more exhaustive, at least at the time of employment.

The airline medical department plays another role which is usually overlooked but which is of great importance. Hopefully, the pilot will go to the department whenever he has any medical problem. The physician would have a complete medical history in his files and could easily note any deteriorating changes that have occurred. A good relationship could be established between pilot and physician whereby the pilot might confide in the physician, and potentially hazardous conditions would be discovered and treated before any permanent damage occurred. The pilot should be encouraged to make these visits for treatment.

Both the pilot and controller, and to a lesser extent the passenger, are controlled by formal regulations, whether governmental or industrial. However, there is one other set of regulations which is as important but which is unwritten. This is the standards which the individual applies to himself. The time for examinations as stated by the federal government for the commercial pilot is every six months or one year; for the controller, the time is every year; and the time for the examination of the pilot by the airline will vary with the particular company. This leaves periods of time during which the pilot and controller are without direct medical supervision. The passenger is never under medical supervision, and, unless his physical condition is obvious, it never comes to the attention of the flight crew.

Self imposed regulations, or attitudes, are rarely mentioned but are extremely important. While many medical conditions will begin without giving any warning to the individual afflicted, many others will give some clue. It is well known that individuals have a tendency to ignore symptoms and deny their existence. This may occur among passengers, but the average passenger has little to gain and much to lose by not revealing his physical condition. However, the average passenger does not know what conditions are relevant and so will not make the information known. The airlines should give each passenger a list of conditions that would make flying contraindicated so that the passenger could impose self control. Failure to do so could make the airline liable if injury resulted.

The pilot and controller are in a different situation. If they reveal their physical defects, they could lose their position. The effect would be much greater on the pilot than on the controller who is protected by his civil service rating and will not be as adversely affected as will be the pilot. Coupled, then, with the natural denial of physical illness is the fear that admission will cost the individual his position. This combination of effects would tend to limit the effectiveness of any self-imposed regulatory system that the individual would apply. The effect of this denial could have a severe effect, and an otherwise curable condition could become incurable before treatment was instituted.

Therefore, it would benefit both the airlines and the government to
stress the importance of preventive care and the reporting of disease symptoms. While I do not think that this is a complete solution to the problem of early reporting, attitudes can be changed, and it would benefit the entire industry if more pilots and controllers were to report their symptoms at an earlier date.

III. CLARITY OF REGULATIONS

That regulations must be enacted is taken for granted. However, the types of regulations enacted are important. While we hope the regulations are clear to the physician, in the final analysis the regulations will be interpreted by lay personnel and not physicians. If the regulations are not clear to the physician and leave openings for a variety of interpretations among physicians, then the impartial reviewer of the regulations cannot make a clear decision. Therefore, where possible, clear tests and measures should replace generalities. Then the results obtained for a given individual can be checked independently if a question should arise. The FAA has made some changes in the areas of visual standards and cardiac measures. The regulations should not remain static, and new measures should be introduced as soon as is reasonably possible.

The reason for this demand for methods to check the results is that the regulations are not applied to the pilots and controllers in a consistent fashion. Physicians who give the examinations for the FAA are not dependent on the FAA. All work independently and have their own medical practices in addition to performing aviation physical examinations. These physicians, called Aviation Medical Examiners, apply for and become examiners for a multitude of reasons which may, in turn, affect the manner in which these examinations are performed and the results obtained after an examination. For example, physicians may become examiners after completion of their military service during which they gave flight physicals. Upon separation from the military service they might wish to continue their affiliation with the field of aviation. Having been trained by the military, the physician might expect the applicants to meet the same standards of physical fitness as required by the armed services. However, the standards are not the same as the federal regulatory standards. An individual might be able to qualify under the federal regulations even if he could not qualify for active military flight duty.

Other physicians might become examiners in the hopes that their incomes would be supplemented as follows: first, they would be paid for the physicals performed; and second, they might be able to get some of the airmen and their families as regular patients. Economic benefits being the primary motive, this group of physicians might be reluctant to fail an applicant and so might accidentally overlook an item or symptom that would otherwise be noticed.

A third group of physicians approach their duty as Aviation Medical Examiner as if they were the protectors of aviation. On these mens' shoulders rests the safety of every plane and passenger who flies with a pilot qualified by such an examiner. Approaching their duties with this attitude,
physicians would tend to be extremely strict in their interpretation of the regulations. Indeed, such physicians might go further. In one article recently published in *Aerospace Medicine,* a physician stated that during the physical examinations he would question the applicant on his knowledge about the plane he intended to fly and the conditions under which he was going to fly. He left the implication that if the pilot were deficient in this necessary knowledge, then he might look more diligently for a medical reason for not giving the applicant his medical certificate. This is not the role of the Aviation Medical Examiner.

A fourth area of concern is the effect of specialization. When a physician specializes, all his patients will be limited to the area of specialization and few general physical examinations will be performed. As an Aviation Medical Examiner his examination would probably stress the area of specialization and be more casual with the other parts of the examination. This might lead to important items being overlooked.

With these divergent approaches to the physical examination, consistency is hard to obtain with vague regulations. Clearly worded, clearly defined regulations applied through the use of specific tests would help eliminate diverse results and would act as a check on the results when questions arise. However, the FAA has utilized another technique to eliminate inconsistencies. Each year, medical seminars are held under the auspices of the FAA. Aviation Medical Examiners are expected to attend so that basic information on how to fill out forms and conduct tests may be given. It is an attempt, through classroom training, to instill uniform techniques. As an idea, it is excellent.

I was fortunate enough to attend an Aviation Medical Seminar last summer so that I had an opportunity to view the actual operation. The physicians present were generally interested in the programs offered and listened to the lectures with great interest. However, the entire value of the seminar was destroyed in one lecture and made the medical regulations appear to be a farce. This particular lecture was given by a physician who was in the full-time employ of the FAA. During the lecture, he told the story of a pilot for one of the major airlines who developed a retinoblastoma. This as a malignant condition of the eye for which the treatment is the removal of the eye. The pilot stopped flying and was given a desk job with the airline. After a period of about one year he developed depth perception with the remaining eye, and the FAA made the determination that an exemption could be granted. However, to show the close cooperation between the airlines and the FAA, a physician called the particular airline and asked them if they wanted the pilot back on a flying status. As it turned out, the airline did want the man to function as a pilot, and with the approval of the airline a waiver was granted. However, if the airline had not wanted the man, that waiver, to which he was fully entitled, and which would have been granted had he not been associated with that airline, would never have

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been granted. The attitude of the physicians after hearing the story varied. Some were shocked and disbelieving. Others, the majority, just accepted it as the way things are done in government and the way they could treat matters in their practice.

Contrary to the federal system, the airlines' medical regulations are internal documents and not available to the general physician or to the pilot. Theoretically, the regulations could be applied fairly consistently because only a few physicians would be involved and they would all be under the control of one supervising director. The problems of variation in application present in the federal system are missing, but not necessarily the problem of abuse.

Once a man has achieved status with a company, it would be difficult for that airline to discharge him. His union would protect him from assaults by the company in any direct fashion. However, if the pilot were suddenly to develop some ailment or become psychologically unfit he could be grounded. It is extremely hard to disprove an illness. I do not mean to say that the airline medical office does not serve an important function both for the airline and for the health of the pilots; but some protection should be given so that abuse does not occur. To this end I feel that all regulations established by airlines should be printed and made available for public review. The criteria used would be known, and if any question arose the physical condition of the individual could be checked against the methods used and a determination made to see if similar results could be obtained.

The hazard with these regulations as well as with the federal regulations is that they are necessarily vague in some areas which leads to unnecessary disqualifications. These medical vagaries do not harm the FAA in that the number of pilots available will not directly affect the government. However, the application of vague regulations will affect the airline if too few pilots are available and definitely will affect the pilot and controller and his attitudes towards the regulations. Fortunately, we presently have no shortage of available pilots, but the situation may not always be the same.

To the pilot and to a lesser extent the controller, the loss of the medical certificate will have a great effect on his life and livelihood. Knowing this the pilot, not understanding medicine, will always be somewhat suspicious and fearful of the results that may arise after an examination. This is natural and not unusual. The pilot and controller must be able to trust the individual giving the examination. If he does not, the examination will lose much of its value. Pilots and controllers know that their passage of the examination is based on the decision of the examiner and know that that decision may come whether they are in good physical condition or not. Such attitudes tend to make the examinee hide and ignore what is actually present. Conditions that could be taken care of immediately with no lasting harm will be allowed to linger until great permanent damage occurs.

It is therefore mandatory that if the physical examinations are to have the value they should have and if the Aviation Medical Examiner and the airline physician is to play the natural role for the pilot, that the physician apply the regulations as they are written and not as he may wish they had
been written or desires that they be interpreted. General aviation safety
demands that this be the situation.

I do not mean to say that if every examiner fulfilled his duties we would
not have any medical problems. Indeed, we are all too familiar with the
case of Captain Pigman and the American Flyers crash in Oklahoma to
state that this would be the case. There will always be a certain group of
men among the thousands of pilots and controllers who will make attempts
to hide their physical defects, and some of them will be successful. There
will always be a certain group who will falsify their medical history forms
and so make the proper evaluation of their physical condition difficult. But,
if the fear of improper decisions is reduced, if it is replaced by a realization
that the medical office and the Aviation Medical Examiner will only find
what is there and not manufacture some defect, then a greater rapport will
be achieved and perhaps some of the difficulties will be removed.

IV. System of Review

To this point, we have discussed the necessity of regulations and the
manner in which the regulations are applied to those regulated. Faced with
the problem of vague regulations and limited lay knowledge, the appeal
procedures should be altered. The present appeal procedures occur with the
commercial pilots. One of the following things may occur: either the pilot
will be denied renewal of his medical certificate at the time of re-examina-
tion, or his certificate will be revoked.

The procedure for appeal after denial of renewal is as follows: the pilot
may apply to the Federal Air Surgeon (FAS) for reconsideration of the
denial. The FAS may then affirm the denial, or he may turn the matter
over to the Medical Review Board which is comprised of a group of physi-
cians who are specialists in given areas of medicine. The Board is not estab-
lished in the regulations or by statute but has been established privately by
the FAS for his assistance. If the Board affirms the denial or if it states that
the certificate is to be granted, the opinion is not binding on the FAS,
and he may deny the application. Once the pilot has received the formal
denial from the FAS he may then begin an action before the National
Transportation Safety Board (NTSB) hearing examiner. At that time
the pilot would be expected to present medical evidence and would
have to carry the burden of proof as to the absence of the medical defect
found initially by the Aviation Medical Examiner and which was con-
firmed by the FAS. The other possibility open to the pilot who has been
denied a renewal is to ask for an exemption for the physical defect. It is
then within the discretion of the FAS whether the exemption will be
granted or denied. The effect of asking for the exemption may be that the
pilot has admitted that the defect is present. However, this point has never
been contested.

The other course of action available against the pilot is revocation of

4 14 C.F.R. § 67.27(a) (1967).
6 14 C.F.R. § 301.16 (1967).
the valid certificate. This procedure is not favored by the FAA. The pilot may appeal directly to the CAB and the burden of proof is on the government.7

Neither of these procedures is very good. Going through these procedures is time consuming and expensive. The expense is prohibitive for the average airman, especially when he must carry the burden of proof. What adds greatly to the individuals' problems is the reluctance of physicians to testify or become involved in any type of legal proceeding. While the pilot may have a good case to present, he may have difficulty in getting and bringing forward adequate witnesses. The FAS, with his reliance on the Medical Review Board, has no dearth of qualified physicians at his disposal. In addition, there are many centers in the United States where aerospace medical research is performed and from which qualified physicians could be utilized in the individual hearings. Needless to say, the average pilot does not have such resources.

V. A Proposal

I would therefore propose the following as a supplement to the present system in the hopes that a certain amount of speed would be introduced into the system and that a reduction in the overall expense of the appeal process would occur. In a selected number of major cities across the United States specialists should be contacted who would be willing to give impartial physical examinations and submit reports. In each case, three specialists in the given field in question would be selected to give the person whose renewal was denied or whose license is being revoked a chance for a re-examination. One specialist could be selected by the FAS, one by the pilot perhaps through his family physician or organization representative, and one on whom both parties could agree. The pilot would be able to submit to a reexamination within thirty days. Each physician would be informed as to the nature of the questionable condition present, asked to examine separately, not confer with the others, and state his opinion as to the presence or absence of the particular condition. Each would be requested to submit reports answering the question as to the presence or absence of the particular condition. If all three found in favor of one or the other of the parties, the decision would be deemed binding on both parties. If there was a split in the decisions of the panel two-to-one in favor of the pilot, he would be allowed to return to flying with whatever restrictions for periodic re-examination the FAS felt necessary. However, this would not preclude the FAS from taking an appeal and carrying the burden of proof. If the decision were two-to-one in favor of the FAA, the pilot would not be permitted to return to the air until receiving permission from the FAS. The pilot would not be precluded from taking an appeal. The examining physician finding for the pilot would be expected to testify before the Board. The burden of proof should again be on the FAS because of his greater resources and expertise. This system would probably remove the majority of cases from the appeal processes and be rapid in its operation.

The same method or a similar method could be utilized if a pilot were considered physically unfit by an airline medical office. This method would be an attempt to remove the individual, at least for the period of the particular examination, from the involvement of the vagaries of medicine administered by the airline.

VI. Conclusion

An attempt must be made to improve the application of the medical regulations. Until the day comes when all of medicine is computerized and the need for a human diagnostician is gone, physicians will have to decide the individual’s medical condition; but even with a set standard, the results will rarely be uniform. To override the detrimental effects on the affected individuals, impartial medical panels would be instituted. In this fashion medical controversies will not be put to the poor test of cross-examination and the results throughout aviation will be more uniform. The granting of the medical certificate should be the same no matter who you are, who examined you, or what is the extent of your aviation knowledge.