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BEFORE THE

POSTAL RATE COMMISSION

WASHINGTON DC, 20268-0001

POSTAL RATE AND FEE CHANGES, 2006	**Docket No. R2006-1**

REBUTTAL TESTIMONY
OF
GEORGE R. LAWS
ON BEHALF OF THE
UNITED STATES POSTAL SERVICE

Revised November 30, 2006

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AUTOBIOGRAPHICAL SUMMARY

My name is George Laws. I am the Manager of Letter Mail Technology for U.S. Postal Service Engineering in Merrifield, Virginia. I received a Bachelor of Science Electrical Engineering degree with Distinction in 1972 and a Masters Electrical Engineering in 1974, both from the University of Virginia. I received a Masters of Business Administration in 1987 from George Mason University. I joined the U.S. Postal Service Engineering as a Principal Program Engineer in 1989, and was the lead electronics engineer on the Advanced Facer Canceller System (AFCS) program. After the AFCS program, I was either the program manager or lead engineer on numerous letter automation improvement and letter recognition programs. I have served in my current capacity since 2000.

PURPOSE AND SCOPE OF TESTIMONY

The purpose of my testimony is to rebut the proposal of Greeting Card Association witness Morrissey (GCA-T-3) to change the current aspect ratio machinability requirements for letters and cards. In doing so, I will explain why the results of the experiment described in the testimony of witness Morrissey are unreliable and should not be used to support any reconsideration of current requirements. I also will describe the methodology and results of an engineering study performed by Postal Service at the request of GCA to determine the compatibility of square cards with current automated mail processing equipment. I will show that these test results support retention of the current aspect ratio machinability requirements. Finally, my testimony will explain why an increase in the maximum allowable weight of an automation mail piece from 3.5 ounces to 4.0 ounces, as proposed by POSTCOM witness Otuteye (POSTCOM-T-8) is not operationally realistic.

I. THE CHALLENGE PRESENTED BY SQUARE LETTERS AND CARDS

Greeting Card Association witness Morrissey's testimony (GCA-T-3) raises an issue that, I am told, is not routinely the subject of review in these proceedings. Accordingly, before I explain why the Commission should not rely on his experiment to change current aspect ratio machinability requirements, it seems worthwhile to explain, from an engineering standpoint, why those requirements are in place.

When First-Class Mail arrives at the Processing and Distribution Center from various collection points, it is potentially a mix of single-piece letters and cards, single piece flat mail, or small parcels. This collection of different types of mail is separated into individual flows by a Dual Pass Rough Cull System (DPRCS). The single piece letters and cards from the DPRCS are distributed by a Loose Mail Distribution System to an Advanced Facer Canceller System (AFCS). A Processing and Distribution Center may have a number of AFCS machines, depending on the volume of letters and cards processed each night by that Processing and Distribution Center. The AFCS is used to orient the single piece letters and cards, to cancel the stamp on the letters and cards, to lift an image of the front of the mail piece so that the destination of the mail piece can be determined, and to sort it into one of six accept sort pockets based on its next processing step.[1]

The AFCS uses several steps to orient letters and cards. First, an Edging Channel orients the mail pieces in one of four orientations. Mail pieces enter the Edging Channel randomly in one of eight possible orientations, any of the four edges down with

[1] Or into a seventh reject sort pocket if the mail can not be faced.

the address side facing out or any of the four edges down with the back, non-address, side facing out. The Edging Channel uses eccentric rollers and knock-down barriers to align mail pieces on their longer, more stable, edge. The four orientations are reduced to two orientations by a Twisting Module. Mail pieces are turned 180 degrees along their horizontal axis if no indicia is detected by a first set of Indicia Detectors.[2] After the mail pieces have passed through the Twisting Module, a second set of Indicia Detectors examines the indicia zone of the mail pieces to confirm (a) that all the mail is in one of two orientations, stamp down-leading or stamp down-trailing and (b) that it has valid indicia. Each sort category on the AFCS has two sort pockets to accommodate the two possible orientations, "lead" and "trail," in each sort category. The final step in orienting mail pieces is when the operator moves the mail pieces from the sort pockets to a letter tray. The operator turns the "trail" mail 180 degrees around a vertical axis so that it is oriented the same as the "lead" mail.

The mechanisms used by the AFCS works very well for rectangular mail pieces with an aspect ratio (length divided by height) between 1.3 and 2.5. However, the AFCS cannot always correctly orient pieces with a low aspect ratio, such as a square piece, for two reasons. First, low aspect ratio pieces may not be in one of the four anticipated orientations when they leave the Edging Channel, because all four edges are equally stable, as opposed to rectangular mail pieces that are more stable on their long edges. Secondly, mail pieces with a low aspect ratio can potentially tumble when they are not being tightly held by a belt on either side of the mail piece, when they are

[2] The Indicia Detectors look for indicia in a 1.5 inch high by 2.5 inch wide zone on bottom leading corner on one side of the mail piece and the bottom trailing corner on the other side of the mail piece.

not in pinch. The AFCS has three Leveler Sections, one after the Feeder and one after each of two Twisting Modules, where the mail pieces are not in pinch, which allows the mail pieces to settle and adjust for variations in the height of mail pieces. Low aspect ratio mail pieces can potentially tumble while they are moving through the Leveler Sections.

Even if low aspect ratio pieces (square cards) complete their processing on Postal Service automation equipment, such pieces often require more handlings than rectangular cards to be processed on Postal Service automation equipment. Since the orientation of a mail piece, as it arrives at the Edging Channel of the AFCS, is random and each of the eight possible orientations is equally likely, the AFCS will not be able to orient half of the square cards, on average. The ones that it cannot orient will be sorted to the reject pocket. Periodically, while single-piece First-Class Mail is being faced and cancelled, the mail that is sorted to the reject pocket is reprocessed on the AFCS with the operating mode of the machine set to Video Facing. However, even in Video Facing mode, the AFCS still is not be able to orient the square cards that initially sorted to the reject pocket, since they are not in one of the four anticipated orientations. Even if the AFCS can determine that a mail piece is in one of the four unanticipated orientations, it does not have a mechanism to change a mail piece from one of the four unanticipated orientations to one of the four anticipated orientations. Thus, the square cards will again be sorted to the reject pocket. Depending on the volume that is sorted to the reject pocket during Video Facing mode and the time remaining until the facing and canceling operational is to be completed, the AFCS operator will either manually face the mail that sorted to the reject pocket during Video Facing mode and process it along

with mail that was sorted to the accept pockets, or send it to the Manual Processing Section.

II. THE GCA SQUARE LETTER EXPERIMENT IS FLAWED AND UNRELIABLE

In an effort to support a change in the existing DMCS requirements for machinable letters and cards, Greeting Card Association (GCA) witness Morrissey conducted an experiment which purports to determine the degree to which such cards are successfully processed on Postal Service automated cancellation and sorting equipment. GCA-T-3 at 1-6. As I will explain below, the results of this experiment should not be relied upon to justify changing current machinability requirements.

The GCA experiment involved eight participants, located in different geographic regions, each mailing 63 square and 63 rectangular cards (in envelopes) to witness Morrissey. After receiving the envelopes, witness Morrissey "examined them for visible signs of manual or machine processing." *Id.* at 4. To determine the method of cancellation, witness Morrissey looked for either the machine printed cancellation mark containing printed text and a series of wavy lines, or the round cancellation stamp indicating manual cancellation. *Id*. To determine the method of sortation, witness Morrissey looked for either a printed bar code or an I.D. tag in orange fluorescent ink to indicate machine sortation, and the absence of any barcode or I.D. tag to indicate manual sortation. *Id.* at 4-5.

Based solely on these observations, witness Morrissey concluded that the success rate for automated cancellation for square cards could have been as high as

80.45 percent, and for rectangular cards, 91.84 percent.[3] *Id.* at 5. Witness Morrissey also concluded that the success rate for automated sorting for square cards was 95.24 percent, and for rectangular cards, 100 percent. *Id.* at 6.

The fatal flaw in this experiment is that witness Morrissey attempts to determine *how* a process works, and whether or not there are additional costs, by only observing the input and the output of the process. Witness Morrissey himself admits that his experiment does not reveal:

- the percentage of test pieces that were rejected on the first pass on an Automated Facer Canceller System (AFCS),
- the number of pieces that required manual facing and/or one or more additional passes on an AFCS or other piece of cancelling equipment,
- the number of pieces I.D. tagged on an AFCS or DBCS but rejected within subsequent automated mail processing steps due to low aspect ratio and the propensity of pieces to tip over,
- the number of pieces barcoded on a DBCS but rejected within subsequent automated mail processing steps due to low aspect ratio and the propensity of pieces to tip over, or
- the number of pieces that were successfully processed throughout the entire automated mailstream without the manual handling of rejects. Tr. 21/7780-7781.

To claim that that an experiment that reveals none of the above can determine the degree to which square single-piece First-Class letters are successfully processed by

[3] These numbers also could have been as low as 70.44 percent for square cards, and 80.36 percent for rectangular cards. *See* GCA-T-3 at 5-6.

Postal Service automated equipment is similar to claiming that one can determine the route someone took to travel from point A to point B and how much it cost to make that trip by only looking at the outside of the vehicle to see if there is mud on it.

III. THE USPS ENGINEERING TEST CONDUCTED FOR GCA SUPPORTS THE CURRENT ASPECT RATIO MACHINABILITY REQUIREMENTS

Two months before witness Morrissey conducted his square card experiment, the Postal Service provided the Greeting Card Association the results of an extensive test conducted by the Postal Service Engineering department in Merrifield, Virginia, at the behest of the GCA.[4] Among other things, the USPS Engineering test was designed to determine the compatibility of different size cards with Postal Service letter automation equipment. The receipt of the USPS Engineering test was acknowledged by witness Morrissey in response to interrogatory USPS/GCA-T3-3; Tr. 21/7673.. I hereby incorporate that USPS Engineering test report into my rebuttal testimony. As the Commission will observe, the USPS Engineering test investigated each of the facets that witness Morrissey's experiment failed to cover, and the results of this USPS Engineering test support the retention of the current requirements for machinable letters and cards.

In support of the USPS Engineering test, GCA provided 7640 envelopes to the Postal Service that varied in size from 3x4 to 8-7/8x12-1/2, and in aspect ratio from 1 to

[4] All of the cards in witness Morrissey's experiment were mailed on July 20, 2006. GCA-T-3 at 4. The Postal Service provided a final version of its test results to GCA on May 18, 2006. *See* Tr. 21/7673. The test report itself can be found at Tr. 21/7681 – 7712.

2.6. Refer to Table 1 in, *Test Report, Effects of Envelope Size, Aspect Ratio, and Color for Greeting Card Association (GCA) Samples* for a complete list of the sizes and aspect ratios included in the test. Tr. 21/7689.[5] The aspect ratio test deck was made by stuffing, sealing, and stamping the sample envelopes, the same as if they contained greeting cards prepared by individuals. The prepared deck was processed the same as single piece First-Class Mail by passing it through a Dual Pass Rough Cull System and an AFCS. Observations were made on whether or not the test piece was successfully processed and sorted to an accept pocket, or if the test piece was rejected. If the test piece was rejected, where the piece was rejected by the automation equipment was recorded.

After testing was completed, the following results were obtained. All of the oversize pieces in the aspect ratio test deck, pieces taller that 6-1/8 inches or longer that 11-1/2 inches, were rejected either by the Dual Pass Rough Cull System, the flats extractor on the AFCS, or the Fine Cull Module on the AFCS. This result was expected, since the systems that rejected the oversized pieces were designed to reject either flat-sized pieces or pieces that exceed height and length requirements. The average number of pieces successfully processed and cancelled in samples sets that contained pieces that satisfied current size and aspect ratio machinability requirements was 99.85

[5] GCA also provided 4507 envelopes that varied in sixteen different colors. Two different tests were design, one to determine the effect of size and aspect ratio on the capability of the AFCS to orient and cancel the test piece, and a second to determine effects of envelope color, ink color and stroke width on readability. Because the effects of envelope color, ink color, and stroke width on readability are not at issue here, I will limit my discussion to the effect of size and aspect ratio on the capability of the AFCS to orient and cancel the test piece.

percent. In all but two of those sets, 100 percent of the pieces were successfully processed. In contrast, only 48.39 percent of the pieces in sets with an aspect ratio of 1, square pieces, were successfully cancelled and processed. Three sample sets with pieces that satisfied height and length requirements, but that did not meet aspect ratio requirements, had 100 percent of their piece successfully processed and cancelled. The aspect ratios of those sample sets were 1.28, 1.29, and 2.60.

The performance of square cards, test pieces with aspect ratios of 1, performed as expected, with approximately half of the test pieces being rejected by the letter automation. Thus, on average, half of the low aspect ratio pieces mailed can be expected to require extra processing and manual handling by the Postal Service. Since low aspect ratio pieces may be returned to automation processing after some extra manual handling, the fact that they may have been cancelled using the AFCS does not indicate that there was no additional handlings or costs to process them.

Even though pieces in three sample sets that had aspect ratios that were slightly outside of current aspect ratio requirement processed successfully, it is not recommended that the aspect ratio requirement be adjusted. There is a marginal benefit to the acceptance of mail just outside the current aspect ratio requirement when compared to the combined effort to: 1) change widely published requirements; 2) obsolete, revise, and redistribute templates and gauges; and 3) revise training materials and current mail acceptance procedures. Therefore, no changes or exceptions are recommended to the current size and aspect ratio requirements.

IV. THE PROPOSED INCREASE IN THE MAXIMUM ALLOWABLE WEIGHT OF AN AUTOMATION MAIL PIECE IS NOT OPERATIONALLY REALISTIC

In his testimony, witness Otuteye (POSTCOM-T-8) suggests that the heavy letter exception should be raised from 3.5 ounces to 4.0 ounces, based on the claim that pieces mailed by Money Mailer, LLC weighing between 3.5 and 4.0 can are being processed on Postal Service automated equipment. *See* POSTCOM-T-8. The problem with this claim is that witness Otuteye is only considering a single mail piece. Testing by the Postal Service has demonstrated that processing 3.7 ounces letter mail does cause processing problems and damage to the automation equipment. It is not possible to establish a weight limit on automated equipment such that there is a certainty that all pieces below the limit will process well and all pieces above the limit will process poorly, regardless of mail piece construction. Just as witness Otuteye claims that his pieces are processing successfully, the Postal Service has experienced countless instances of heavy letters below the 3.5 ounce limit processing poorly. The limit must be established in consideration of the letter mail base in general, with a goal of establishing an overall automated letter mail stream that has a high probability of processing at an acceptable throughput and jam rate.