A title such as this one would indicate a subject covering a long time interval. Actually not until the beginning of the development of the limited access interstate system in 1956 did we enter the interchange business in a large way. Let us then class everything prior to 1956 as Past, from 1956 to date as Present, and beyond today as Future.

The junction of U.S. 60 and Ky 151 several miles west of Frankfort was rebuilt about 1940. Whether a "trumpet" design was intended here or the separation was a "natural" and the ramps just added on is difficult to determine now. An interchange at "Chaffee Avenue" and U.S. 31W at Fort Knox has been in existence nearly 25 years and is a good example of early designs in which little attempt was made to develop any speed at the entrance and exists of the ramps from either the mainline or cross-road. Apparently not much over crawl speed was intended at the cross-road structure or on the ramps. The designs for the Watterson Expressway at Louisville in the early 1950's were based on higher all around speeds. In sufficient funds forced many design compromises which today would be untenable.

Few standards had been developed for interchange designs until the A.A.S.H.O. publications began appearing in manuscript from in the early 1950's followed by the final publication of the "Blue Book" in 1954 and the "Red Book" in 1957. These were based on field observations made on existing interchanges in other states. They were most welcome to the many neophyte designers whose job was to turn out the plans for the many interchanges required for the new interstate system.

The volumes of traffic which immediately began using the Watterson Expressway far exceeded expectations and pointed out the inadequacy of the slow speed ramp exits and entrances. The Bardstown Road Interchange was the last built prior to the route being designated I-264 which of course brought the necessary money to do proper designs. The loop radii are 125' which permits speeds in the 20 to 25 M.P.H. range. Here in Fayette County, the Winchester Road and Lexington Circle Interchange is an illustration of a higher type design which was sacrificed because of Rights of Way disputes. It also illustrates the importance of an adequate design at the ramps exit and entrance. The short weaving section on the Lexington Circle will soon be giving serious troubles. Rights of Way have been purchased and plans drawn for upgrading the design at this site. Present plans call for construction of the outer connectors of a cloverleaf design and to use those as a "diamond" design until traffic warrants the final "cloverleaf" construction.

The foregoing is an attempt to explain and review the few interchanges which were built in those years between approximately 1940 and 1956 and which at least you younger people in the audience will agree I have correctly labeled, the Past. Proceeding then to our "Present" designs which were based on the A.A.S.H.O. "Blue Book" we find the application of the principle of matching the ramp speed to the running speed of the expressway at the point of entry into the expressway. No matter what the design, few drivers will enter or leave an expressway in exactly the same fashion. The curvature, superelevation and speed is therefore dictated by the average driver. Even with the A.A.S.H.O. standards
to follow it has been necessary for our Design Division to select which values from the standards are to be used for our designs and issue memorandums as guides to those preparing plans.

In February, 1960 a Special Committee for Freeway Study and Analysis Report was published by the A.A.S.H.O, in which recommendations were made of Ramp Exit and Entrance Designs which from field observations were giving the best operation. Their recommendations were very similar to those for on-ramp designs made by Fukutome and Moskowitz of the California Division of Highways and reported in Bulletin 235 a Highway Research publication of 1960. A standard design based on these findings has been made by our Division and approved by the Bureau of Public Roads. Our future plans are all based on these standards and as many of our old plans as was possible have been revised along these lines. A comparison of early to recent designs would reveal the following changes:

1. Ramp speed increased from below 20 M.P.H. to 30 in urban areas and 50 in rural and directional designs.
2. The ramp cross-section standardized 16' wide with generally 2' stabilization on the left and 6' on the right. Early designs had many combinations of curbs on right, left, or both sides.
3. Acceleration and Deceleration lanes have advanced in design from non-existence to parallel lanes with tapers and finally to a straight taper for each, the deceleration being roughly 500' long and the acceleration 1000'.
4. Loop Radii increased from as low as 65' to between 150' in Urban and 230' in Rural. (Minimum)

On Interstate 75 North of Lexington there are 15 interchanges under construction. Those near Covington are of a 1955-56 vintage and no amount of recent revision can up date the design beyond a certain point. Those with high volumes of traffic will be in a 50 to 60 M.P.H. speed area which should permit satisfactory operations with the slow speed ramps. A good season for surfacing construction should see I-75 open from Covington to Williamstown by the end of this year. The Fayette County section of I-75 has five "diamond" type connections to local roads two of which are on the seven mile section common to I-64 and I-75. The Northwest connection of I-64 and I-65 near the Blue Grass Quarry is of the "Trumpet" type and the southeast connection is of the three level directional type both of which have a 50 M.P.H. design speed on the ramps except for the two minor movements at the Northwest end. Madison County has two "diamond" type designs and one "diamond" plus a loop which should be graded out by fall. From Richmond to the Tennessee Line there will be ten interchanges of the diamond type, only the two nearest the state line having been designed at present. The total on I-75 will be 36, one of which will be common to I-71 and four common to I-64.

Between Lexington and the West Virginia line on I-64 there are to be about 12 interchanges all diamonds except the one on U.S. 227 at Winchester which has two loops. Four are under construction in Clark and Montgomery counties and will be open for traffic this fall or soon after. Of the remaining eight, five have been designed or are being designed.

From Lexington Westward on I-64 and not including those common to I-75 there remains but one near Midway to design. From Jett to the Watterson at Louisville there are nine, of which seven are under construction and will be open for traffic by fall if all goes well. The remaining two have been designed. All are diamonds except an added loop at U.S. 127, Ky 53 and Ky 55, and a standard cloverleaf design at the Outer Belt in Jefferson County. The connection to I-264 is to be a cloverleaf, the design for which is being made at present. The route through the parks in Louisville contains two "diamond" connections to city streets and an elaborate "braided" connection to I-71 near River Road. The connection to I-65 is a four way directional and is by far our most elaborate and costly in the
From this point to the Ohio River Bridge at New Albany, Indiana, now under construction, there are to be on and off ramp connections which would total between two or three interchanges and a directional connection with I-264 near 37th Street and the Northwestern Parkway. Our present schedule calls for a start this spring on initial construction of enough of this interchange to provide access to Bank Street from the New Albany Bridge.

Progress on I-65 has been limited to the partial construction of a cloverleaf design at the future Elizabethtown by-pass and two “diamonds” South of Elizabethtown. The design of a diamond at Upton and one at Munfordsville is being done at the Bowling Green Office but nothing more than a preliminary line exists South of Munfordsville. Perhaps a half dozen will remain to design between there and the Tennessee line, all of the diamond type.

The section of I-264 also known as the Western Expressway in Louisville contains the very controversial design at Shively. Advocates can be found for designs varying from a simple diamond to full directional. Our Division of Planning is at present making an extensive study of this site and the upgrading of Dixie Highway. Between the beginning at Shively and the end at Bank Street of this section there are enough ramps planned to total about three interchanges. Under contract for design is the southern section between Shively and Algonquin Parkway. Under design also is a diamond at U.S. 42 east of Louisville.

I-71 between I-264 at Louisville where a three level directional is planned and I-75 near Walton where a “trumpet” design is planned will have about six diamonds. Design work has been started only on the Jefferson County Section. There is also to be a diamond or split diamond at Zorn Avenue.

I-24 in Western, Kentucky is still only a line on a map.

In addition to our Interstate program we have non-access or partial control access expressways with interchanges at Lexington, Stanford, Owensboro, Madisonville, Henderson, and Mayfield. Lexington’s consists of ten interchanges, two of which have been built, one under construction, and rest in varying stages of design. The one at Stanford has been designed. The four at Owensboro are nearing design completion. The sections of U.S. 41 at Henderson has two and at Madisonville four all of which are under construction at present. U.S. 45 by-passing Mayfield is to have three, two of which are being constructed.

The number of interchanges listed above totals one hundred and eleven. Assuming an average cost of slightly less than four hundred thousand each not including bridges gives a total cost of forty million dollars. You will agree this is a large investment even if spread over say ten years.