A Bridge Too Far
Out of the sky comes the screen's most incredible spectacle of men and war!

Joseph E. Levine presents
A BRIDGE TOO FAR

Dirk Bogarde
James Cane
Michael Caine
Sean Connery
Edward Fox
Elliott Gould
Gene Hackman
Anthony Hopkins
Hardy Kruger
Laurence Olivier
Ryan O’Neal
Robert Redford
Maximilian Schell
Liv Ullmann
David Moses
Ron Matar

Directed by
Joseph E. Levine
Richard P. Levine
Richard Attenborough

Screenplay by
John Addison

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[Poster image with silhouettes of soldiers parachuting and a line of actors' names]
Location, Location, Location?
A Little American Hydraulic History

Most hydraulic designs were based on experience, observation, and historical performance.

Canal and railroad projects helped develop the profession of civil engineer in America.

Railroad companies were key in the advancement in bridge construction technology.

As railroads moved westward, there became the need to design structures for sites with no flood history or nearby structures to reference.

Therefore, tabular or empirical methods were developed that related waterway opening to size of drainage area and other coefficients that accounted for drainage basin and stream characteristics.
The American Railroad Engineering and Maintenance-of-Way Association (AREMA) published a report in 1911 that presented six formulas for waterway area and 21 formulas for design discharge.

The earliest methods for determining waterway openings for bridges and culverts did not consider bridge or culvert configuration.

The concept of a “design” discharge or recurrence interval of expected floods to use when determining structure size was not considered.

In the late 1800s, features of rate of rainfall, condition of soil, slope, shape of drainage area, stream branches, and backwater were mentioned in a textbook on culvert design.

At the same time, Manning’s formula (1890) was developed.

King’s handbook (1918) presented a table of values for determining 2/3rd power and the formula began to be used regularly.
A Little American Hydraulic History

HISTORY
OF
UNION COUNTY,
KENTUCKY
1886
RAILROADS.

That such a fertile county, with so much advancement in agricultural and mining science, should remain until the year of grace, 1886, without a working railroad, has always been cause of much astonishment to travelers in Union County. This apparent anomaly has a good explanation, and, in justice to Union County, the people's history should contain this explanation.

In the first place, Union's insular situation must be remembered. Her river front probably exceeds in length that of any county on the Ohio of the same area. The bend in which she lies has good roads leading to all parts of the river front, and there is no point in Union County, from which a wagon cannot easily reach a river market, and return home in a day. This great, natural causeway has been a formidable and successful rival until now of the railroad in Union County, but no doubt
her influence and prestige is now very greatly crippled by the Ohio Valley Railway.

Railroad people always looked upon Union County as a fine field for railroad enterprise. In the great railroad year, 1872, several enterprises began to make their appeals to Union County people, and these dividing influences did much to unsettle the minds of the people and keep them from permanently deciding and concentrating upon any feasible scheme.
The old adage, that "opposition is the life of trade," may have given the people a cheaper road, because it has been acted out in the case of Union County people; but probably it has also put back the building of a road in some instances, and thus left the county years behind in the scale of progress.

The greatest bar to railroad building in Union County, however, has been placed here by the railroads. The time was when Union County was eager enough for a road. She was so eager, that she voted a tax upon portions of her citizens, without sufficient guarantee that the taxes would not be collected in the event of the failure to build. The road was finished far enough to bind the people to pay their tax, but was practically of no use whatever. The long and tedious litigation following this event soured the people on railroads, and of late years, it is impossible to receive public aid from some precincts, and it is almost impossible to receive private subscriptions from
numbers of men within the humbugged precincts.

Add to all these causes, the ones that exist in all counties, namely: local jealousy, and lack of public spirit in many of her citizens, and you have good and sufficient reasons why Union got a road no sooner than she did. Now let us study the actual history of railroad enterprise in Union County.

**MADISONVILLE & SHAWNEETOWN.**

The first company that seemed likely to ever achieve practical results for Union, was the Madisonville & Shawneetown Road, which was part of the scheme controlled by Winslow.

The scheme of this company was to shorten the distance from Nashville to St. Louis, by running this road across the Ohio at Shawneetown. A ferry, or transfer would have been used for awhile, but it was confidently believed by the patrons of the enterprise, that some day there would be a bridge across the Ohio at Shawneetown.

This ill-starred enterprise failed in the general crash of 1873,
McLean County was formed by act of the Kentucky legislature on February 6, 1854 from portions of surrounding Daviess, Ohio, and Muhlenberg Counties.

The county was named for Judge Alney McLean, founder of Greenville, the county seat of Muhlenberg County.
Established in 1912, the Kentucky Department of Public Roads had 14 employees, a $25,000 annual budget and advised county officials on road matters.

In 1982, what was then called the Department of Transportation became the Transportation Cabinet. Now more than ever, our 5,000 employees are committed to providing a safe, efficient, environmentally sound and fiscally responsible transportation system that delivers economic opportunity and enhances the quality of life in Kentucky.

We invite you to join the Kentucky Transportation Cabinet in celebrating a over century of service and our legacy of leadership.
MAP OF KENTUCKY
SHOWING CONDITION OF STATE ROADS

ISSUED BY
THE STATE HIGHWAY DEPARTMENT

ISSUED JAN. 1, 1928
KENTUCKY HIGHWAYS.

History of the Old and New Systems.

By M. H. CRUMP, C. E.

PUBLISHED BY AUTHORITY OF THE SECRETARY OF AGRICULTURE.

WASHINGTON:
GOVERNMENT PRINTING OFFICE
1895.
roads have been constructed in the State, but there remain some
30,000 or more miles, the greater portion of which are almost impass-
able for several months in the year, and the majority of which have
never been in a condition to carry more than half a load.

The legislature of 1894 passed an act which became a law June 14,
1894, which is a great improvement on the old law of 1789, and its
numerous amendments, and, while by no means all that is needed, it is
a step in the right direction. The following are the most essential
features of the law, known as the Sims road law:

The fiscal court of each county shall have general supervision of all the public roads
therein. The public roads shall be maintained either by money taxation or by hands
allotted to work thereon in the discretion of the fiscal court. The fiscal court shall
have full power and authority to levy an ad valorem tax for road and bridge purposes,
not exceeding 25 cents on each $100 worth of property, assessed for State and county
taxation, and also a per capita tax of not exceeding $1 on each male citizen of the
county, liable to work on the roads, between 18 and 50 years of age.
The fiscal court of any county wherein the roads are worked by the taxation system may appoint a supervisor, who shall be a competent engineer of roads in and for the county, and who shall hold office for the term of two years.

Sec. 29. In counties wherein roads are worked by taxation it shall be the duty of the supervisor to let out to the lowest and best bidder the working and keeping in repair of all roads in the county.

The said court shall provide a period in each year within which the leveling and grading of roads shall be done, but such period shall not extend beyond the 1st of September in any year.

Sec. 36. All male persons confined in county jails or workhouses, under judgment of a court directing that they may be worked at hard labor, shall be available to the supervisor or overseer for the purpose of working them on the public highways.

Plans and Specifications for Grading, Draining, Paving, Metaling, and Graveling Highways in Kentucky.

Grading.

Under this head will be included all clearing and grubbing, excavation and
Third and Fourth Biennial Reports
of the
Department of Public Roads
Made to the
Governor and General Assembly
of Kentucky

November 1, 1915, to November 1, 1919.
THIRD AND FOURTH BIENNIAL REPORT.

The sum of $83,000,000.00 was required to gain the necessary information for the distribution of this money, and make up a plan for carrying on the work. By the time the plans were submitted on Federal Aid work in the State, this country had declared war and the Federal Government determined to suspend road work until after the war; therefore, no work was done until 1919, the year the counties were authorized to vote a tax of 30 cents on each $100.00 of the assessed valuation for the purpose of constructing roads and bridges; thirty-five counties have taken advantage of this Act up to the present time.

Little construction was done in 1918 owing to the scarcity and high cost of labor, but the Legislature of 1919 passed an Act providing for the use of State Aid on maintenance work and the commissioner, believing this to be the most economical way to use the road fund, allowed all counties that so desired to spend their apportionment in maintaining roads already built under State Aid.

Although most of the army had been mustered out before road work started in 1919, labor conditions had improved very little. Nevertheless, the Department, seeing no immediate relief for the situation, started its construction work.

On September 1, 1919, Mr. Wiley resigned as commissioner to accept a position with the Kentucky Rock Asphalt Company, and Mr. Joe S. Boggs, of Richmond, Kentucky, was appointed his successor.

PERSONNEL OF THE DEPARTMENT

Jos. S. Boggs. Commissioner of Public Roads

ROAD DEPARTMENT.

Wm. N. Bolster. Road Engineer
J. D. Franklin. Assistant Road Engineer
Chas. W. Lovell. Chief Draftsman
H. O. Zimmermann. Draftsman
Wm. Sherriffs. Draftsman
E. B. Cavalli. Draftsman
B. O. Oehman. Draftsman
T. B. Pederson. Draftsman

E. J. Trapp. Draftsman
L. W. Adams. Draftsman
H. K. Diamond. Draftsman
T. Freeman. Draftsman
H. D. Burnam. Draftsman

BRIDGE DEPARTMENT.

Chas. D. Sneed. Bridge Engineer
H. R. Creel. Assistant Bridge Engineer
S. P. Ostrander. Assistant Bridge Engineer
J. Revel. Chief Draftsman
C. R. Boxton. Draftsman
F. W. Cooley. Draftsman

AUDITING DEPARTMENT.

L. O. Taylor. Auditor
G. W. Thomas. Assistant Auditor

TESTING DEPARTMENT.

D. V. Terrell. Testing Engineer
J. A. Bitterman. Assistant Testing Engineer

CLERICAL DEPARTMENT.

J. M. Kendall. Chief Clerk
J. A. Higgins. Clerk
Leo Glenn. Clerk
Miss Vernon Calmes. Secretary
Miss Elizabeth Trumbo. Secretary

ENGINEERS IN THE FIELD

DIVISION ENGINEERS.

L. D. Hollingsworth. 1st Division
Hugh Crozer. 2nd Division
S. T. Boone. 3rd Division
T. B. Smith. 4th Division
W. B. Paynter. 5th Division
The 1914 Session of the General Assembly created a system of public State highways, consisting of roads connecting the county seat of each county with the county seat of the adjoining county on the most direct and practical route and a fund known as "The State Road Fund", composed of a five cent tax (reduced in 1917 to three cents) and the proceeds of the automobile license tax, to be provided to pay the State's share of the cost in the improvement of this Inter-County-seat system under the State aid plan. The authority of the commissioner was enlarged and he was empowered to have a general supervision over all roads and bridges being constructed, improved or maintained under the provisions of the Act, and the fund so created to be apportioned to the various counties on the basis of the amount of taxes collected therein for road purposes, with the provision that no county was to receive more than two per cent. of the annual fund, and all counties being required to set aside an equal amount in order to avail themselves of State Aid.

The 1918 Legislature made various amendments to this original Act, among the most important being the apportioning the Road Fund to the counties on the basis of the assessed valuation of the county, thereby enabling the poorer counties to receive a larger return from the fund than the richer ones; the making of surveys and plans for proposed improvements was also placed under the direct charge of the Road Department.

Such, in a general way, is a brief outline of our present laws enacted by three sessions of the General Assembly, seeking for a proper solution of the road construction with State money, and under which we have been attempting for five years to build up a great system of State highways more than 6,000 miles in total length, and on which our efforts have made but little appreciable showing, and which will never be completed during the lifetime of a single person now living in Kentucky, unless great and radical changes are made.

In the application of these laws, a procedure with which most of you are familiar, we first require the Fiscal Court of a county to apply for State Aid by passing resolutions to that effect by May 1st prior to the year in which the money is to be expended. The type of these resolutions set forth the road to be improved, the amount of money expected as their pro rata construction, the amount of money expected as their pro rata construction, and the list of roads to be improved.

THIRD AND FOURTH BIENNIAL REPORT.

part, road taxes collected in the county, assessed valuation, and
binding themselves to set aside their part of the cost of construc-
tion. If these resolutions are approved, the county's share of the State Road Fund is set aside to their credit when the annual apportionment is made, and an annual joint audit of the State Road Fund for that year is made, and the fund is advertised and contracted for by the Fiscal Court or election made to perform same with the county forces; all of which, of course, must meet with the approval of the commissioner, which, if not given, usually creates friction and misunderstandings, and sometimes results in no construction whatever being attempted for a year or two.

During construction, the supervision is under the direction of engineers and inspectors of Road Department, and the county road engineer of the county, whether the work is being done by contract or county forces, it is necessary that the Fiscal Court meet the monthly estimates to the contractor or the monthly bills of the county forces, for which the State reimburses at the close of the year on all work that is in an acceptable condition, provided the county has sufficient money to its credit in the State Road Fund for that purpose.

Looking over this system of road construction in a business way, and in no other way should road building be handled, we find that we are attempting to construct at least six thousand miles of public highways at a minimum cost of $120,000,000.00, with a bonded debt of State and counties not exceeding $2,000,000.00, with but little chance of growth under the present financial arrangement; in other words, sixty years for construction alone, not making any mention of maintenance. Can Kentucky's resources wait this long for development, and her people now living postpone such a vital matter for three-score years? I hardly think so. We give to Fiscal Court, instead of to skilled engineers, the initiative in selecting the road to be improved and the type of construction, and in all due deference to that honorable body, I must say that this right is often abused, in that each year some different road is selected and no completion made of former projects to the county line, and today we have but few Inter-County-seat roads improved under State aid to one county seat to another, with the result that Kentucky has no continuity in the work that has been done with the use of State
money; each magistrate by successful bargaining has tried to get a mile or two of improved road for his district, at the expense of the great traveling public. We make the Fiscal Court one of the contracting parties in the agreement and require the Court to finance the project until proper completion of some certain section thereof, and many instances are now on record where the Court has repudiated these contracts for no reason save a "change of mind", or a lack of money to make payment to the contractor, who has no recourse in law against the Court nor can be assisted in any way by your Road Department.

Five years of trouble of this character have caused our best contractors to refuse to bid on State Aid projects, and many concerns have left the State altogether, and are now working where both parties to the contract are fully bound and where the money is available to meet the estimates.

We give to the county road engineer equal authority in the supervision of State Aid work, which oftentimes is a very pleasant arrangement, but at other times the views of his Fiscal Court are very different from the plans and specifications previously adopted by both the commissioner and the Court, and in consequence friction arises. Especially is this true in smaller accounts in which county authorities are disposed to forget the exigencies of plans and specifications and attempt the use of primitive methods in very expensive ways.

So today under this plan, we have no continuity in our work, funds are sadly insufficient, the State not a party to any contract on which State money is being used, no rights in the selection of either the road to be improved or the type of construction, save the right of disapproval, which oftentimes is the "spark that lights the magazine", no right to compel a Court to complete a contract nor to settle with the contractor, save by withholding count work, in which case the county authorities are disposed to forget the exigencies of plans and specifications and attempt the use of primitive methods in very expensive ways.

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The road location, construction and maintenance should be left to engineers and not to "political pets", and taught them last of all that the modern road that traffic now demands costs vast sums of money, and that this money must be furnished if we ever hope to get Kentucky "out of the mud". Your road department has for five years been engaged in a great cause, it has done a great work in an economical way, it has been the "pioneer that blazed the trail" and can now be a firm foundation for "the better things" that will enable a great State and a great people to take their proper place in the civilization of a new world, on whose threshold we now stand, and which demands of all people forgetfulness of self, a greater love for our brothers and heroic action in all things.

As a cure for the many evils I have pointed out, I would suggest that the following legislation be recommended to your Legislative body for ratification and enaction into law: First: That a primary system of State highways be established, that will give each county at least one main thoroughfare, be laid out by your Road Department to the best interests of the county, and designated by the General Assembly, and that all State and Federal money hereafter must be used on this system until its full completion in each county, before a lateral line is taken up; that the cost of construction be borne principally by the State and Federal Governments, and maintenance entirely by the State, that secondary or lateral roads cannot be laid out by the Road Department until after the completion of this trunk line road in a county.

The construction of this primary system will produce continuity in a few years, and will reduce the mileage from 6,000 to possibly 2,500, and at the same time give a system far better adapted to the needs of the people and the development of our resources, in a much shorter period of time than attempting the construction of the entire Inter-County-seat system. It being understood, of course, that in laying out this system your Road Department would make use of the present Federal Aid projects that have been designated in this State.

Second: That the surveying, planning, contracting for, payment of estimates, supervision and acceptance of all work done on this system of highways and their maintenance be placed under the absolute direction of your State Road Department.
Bossism and Reform in a Southern City

Lexington, Kentucky, 1880-1940

James Duane Bolin
called the extent of Klair's influence on the state level. With his "indefatigable energy and his passion for details, he could plan the course of each and every important bill. Moreover, persons seeking the position of Speaker of the House of Representatives sought his advice prior to the caucus meeting."36 Much like Huey Long in Louisiana, Klair continued to roam the halls of the capitol and the chambers of the House and Senate into the 1930s, even though he was not an elected member of those bodies.

Outside the General Assembly, Kentucky's highway department became increasingly important as a source of patronage in the depression years of the 1930s. Since the passage of the Federal Highway Act of 1921, which increased federal aid for road projects, Kentucky's expenditures for highway building had increased as well even before the depression hit. In 1927 more than two-fifths of Kentucky's $28,400,000 budget went for roads, and by 1931 almost half the state's expenditures were funneled through the highway commission. At the same time legislators cut funding for public schools drastically. By the depression decade the highway commission had become "a source of patronage, campaign funds, and power over legislation and local bodies," and Ben Johnson, chairman of the commission and an ally and friend of Billy Klair, had acquired immense power.37 From Johnson's position as chair of the commission, he fashioned a statewide machine of his own:
He could offer not just a job but livelihood for destitute relatives of influential men, grateful men, who in turn would be expected to repay the favor. The promise of a road meant jobs for local contractors, increased business for merchants (now closer to their customers), and the hope of success for farmers who had seen their perishables ruined by slow transportation. A decision by Johnson on state contracts and state sinecures could mean prosperity or failure to large numbers of Kentuckians who had few alternatives in the bleak days of the Great Depression. In times of plenty men casually looked to Johnson for aid; in hard times they sought it desperately.  

In 1930 the Republican governor Flem Sampson realized that the “highway commission represented the most politically important force in government” in the state. Despite the support of Klair and Johnson in the 1927 election, Sampson dismissed Johnson as chairman of the commission and attempted to create his own Republican machine through his appointive powers. A campaign to take the power to appoint the commission out of the hands of the governor was initiated by Johnson’s son-in-law, J. Dan Talbott, a druggist in Nelson County. Klair and another political ally, Senator Allie Young of Morehead, lined up with Talbott in the effort, and with Klair’s backing, Young
Slope Uphill