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College of Engineering
Mechanical and Industrial Engineering Department
Helmut Hans Korst Papers, 1941-1984

Box 1:

Biographical

Curriculum Vitae, 1980
Biodata, 1983
Awards, 1982
Military Clearance Papers, 1941-1975
Photographs, 1955

College of Engineering

Courses

Mechanical Engineering (ME) 207 Course Notes
Introductory Gas Dynamics, Mechanical Engineering 211 Class Notes, Spring
1982
Mechanical Engineering (ME) 211 Course Notes, Hour Exams, and Homework
Long-Range Planning Committee Minutes, Reports and Faculty Model, 1975-1977 (2
Folders)
Long-Range Effects of Promotion and Retention Policies- Markov Chain Transition
Matrix, 1975
Long-Range Planning Committee Final Report, April 27, 1976
Process of Change, October 13, 1975
Remarks on Tenure, October 5, 1975
Research in Mechanical and Industrial Engineering, College of Engineering, UIUC, 1975
Appointment to the Naval Air Systems Command Research Chair (during Sabbatical),
1979-1980
Sabbatical Leave, Summary Report, First Semester, 1979-1980

Correspondence

Rice University Graduate Seminar, 1961
Separated Flow Conference, Princeton University, 1962-1963
NASA, 1963-1964
General, 1963-1966
American Society of American Engineers (ASME) Parts I and II, 1964
Rutgers Symposium, 1964
Technical Papers, Korst Comments, 1965
North American Aviation, Inc. Internal Correspondence, 1965
Engineering Education Delegation to the People's Republic of China, Committee on
Scholarly Communication with the People's Republic of China, 1978
UNESCO/India, 1983-1984

Box 2:

Publications File

Partial List of Korst Publications

- “Auflösung eines ebenen Freistrahlerandes bei Berücksichtigung der ursprünglichen Grenzschichtströmung,” 1954
- Comments on “The Effect of Boundary Layer on Sonic Flow Through an Abrupt Cross-Sectional Area Change,” March 12, 1954
- “Free Jet Boundary with Consideration of Initial Boundary Layer,” from the Proceedings of the Second US National Congress of Applied Mechanics, June 14-18, 1954
- “The Pressure on a Blunt Trailing Edge Separating Two Supersonic Two-Dimensional Air Streams of Different Mach Number and Stagnation Pressure but Identical Stagnation Temperature,” Reprinted from Fifth Midwestern Conference on Fluid Mechanics, 1957
- “Zur theoretischen Bestimmung des Dellenruckes bei abgelöster Strömung” July 26, 1957
- “Compressible Non-Isoenergetic Two-Dimensional Turbulent Jet Mixing at Constant Pressure, Auxiliary Integrals Heat Transfer and Friction Coefficients for Fully Developed Mixing Profiles,” ME Technical Note 392-4, January 1959
- “On the Separation, Reattachment and Redevelopment of Incompressible Turbulent Shear Flow,” 1961-1963
- “Quasi-Steady Aspects of the Adjustment of Separated Flow Regions to Transient External Flows,” American Institute of Aeronautics and Astronautics (AIAA) Journal, 1963
- “Turbulent Separated Flows” by H.H. Korst- Prepared for the Short Course on Separated Flows, von Karman Institute for Fluid Dynamics, April 17-28, 1967
- “A New Kinematic Eddy Viscosity Model Report,” United Aircraft Research Laboratories, January, 1968
- “On the Correlation of Analytical and Experimental Free Shear Layer Similarity Profiles by Spread Rate Parameters,” ASME, 1970
- “Jet-Plume Simulation,” August, 1971
- “Approximate Determination of Jet Contours near the Exit of Axially Symmetrical Nozzles as a Basis for Plume Modeling,” US Army Missile Command, August 1972
- “A Control Volume Analysis of Supersonic Shear Layer Reattachment” American Society of Mechanical Engineers, 1973
- “Jet Boundary Simulation Comparisons and Fortran Computer Program Description,” October 1973
- “On the Free Shear Layer Downstream of a Backstep in Supersonic Flow,” American Society of Mechanical Engineers (ASME), 1973
- “Analytical and Experimental Investigation of Backblast Overpressures and Impulse Noise,” US Army Armament Command, March 1974
- “Slipstream Boundaries for Supersonic Flow Separating from Bodies of Revolution,” September, 1974
- “Component Analysis and Synthesis for Fully Separated Flows with Special Consideration Base Drag Reduction by Combustion,” Progress in Astronautic and

Aeronautics, 1975

- “Effect of Turbulent Boundary in Cooled C-D Nozzles on Plume Modeling” Final Report prepared under US Army Research Office with Battelle-Columbus Laboratories, February, 1976
- “Determination of Effective Rolling Resistance by Coastdown Experiments on Smooth and Rough Roads, Department of Transportation Analysis,” 1978
- “Full Scale Drag Component Evaluation by Coastdown Testing on Level and Inclined Roads or Tracks,” May, 1978
- “Data Acquisition Systems,” Presented at the 51st Semi Annual Meeting of the Supersonic Tunnel Association, April 10-11, 1979
- “Simulation of Jet Plume Interference Effects During the Launch Phase of Missiles,” AIAA/SAE/ASME 15th Joint Propulsion Conference, June 18-20, 1979
- “The Analysis of Secondary Flows for Tube-Launched Rocket Configurations” US Army Research Office and US Army Missile Command, 1981
- “Evaluation of Vehicle Drag Parameters from Coastdown Experiments Conducted Under Nonideal Environmental Conditions,” March 1981
- FFA Final Report Materials, 1981
- Folder One
- Folder Two
- FFA Final Report, 1981
- “Modeling of Transverse Plumes (Control Jets) Exhausting to a Supersonic Adjacent Flow,” Presented at 55th Supersonic Tunnel Association Meeting, April, 27-29, 1981
- “The Simulation and Modeling of Jet Plumes in Wind Tunnel Facilities,” 1981
- “Some Anomolies in the Boundary Layer and Friction Drag Characteristics of Steamwise Corrugated Walls at Transonic and Supersonic Free Stream Velocities,” *Journal of Fluid Engineering*, 1980
- “Analysis of Secondary Flows for Tube-Launched Rocket Configurations,” *Journal of Spacecraft and Rockets*, 1983
- “Projects, Progress, and Special Accomplishments in the Engineering Sciences,” US Army Research Office, May 1983

Box 3:

Undated Publications

- “Afterbody Drag of Boattailed Bodies of Revolution During Unpowered Flight”
- “Analysis and Modeling of Plume Effects on Missiles Aerodynamics– An Overview”
- “Correlation of Analytical and Experimental Free Shear Layer Similarity Profiles by Spread Rate Parameters”
- “Dynamics and Thermodynamics of Separated Flows”
- “Fitting Losses for Extended-Plenum Forced Air Systems,” *Journal of the American Society of Heating and Ventilating Engineers (ASHVE) Journal*
- “A Study of Flow Separation in the Base Region and its Effects during Powered Flight”
- “A Theory for Base Pressure in Transonic and Supersonic Flow,” Reviews and

Correspondence, Journal of Applied Mechanics

“The Toepler Schlieren Method- Fundamentals of its Analysis and Quantitative Application” Forschungheft, 367 Dr. H. Schardin, Berlin Translation by H.H. Korst and W.M.Schultz

Conferences

“Installed Performance of Air-Augmented Nozzles Based on Analytical Determination of Internal Ejector Characteristics,” AIAA Propulsion Joint Specialist Conference, Colorado Springs, June 14-18, 1965

“Mechanisms of Flows with Separated Regions,” Colloquium and Seminar Speakers, College of Engineering, Rutgers University, November 7, 1968

LANCE Blue Ribbon Panel, Redstone Arsenal, 1970

“Delineation of Mechanisms Controlling Separated Flows by Component Analysis and Synthesis,” Short Course on Flow Separation, The University of Tennessee Space Institute, Tullahoma, Tennessee, November 13-17, 1972

“Component Analysis and Synthesis for Fully Separated Flows,” Short Course for Flow Separation, The University of Tennessee Space Institute, Tullahoma, Tennessee, November 26-30, 1973

“An Analysis of Jet Plume Modeling by Dissimilar Propellant Gases” Presented at the 43rd Semi-Annual Meeting of the Supersonic Tunnel Meeting, Rockwell International, Los Angeles, California, April 2-3, 1975

“Geometric, Inviscid and Viscid Aspects of Plume Modeling by Propellants of Dissimilar Specific Heat Ratios,” Propulsion Interaction Workshop, NASA Langley Research Center, May 12, 1976

“Preliminary Experimental Evaluation of Theoretical Modeling Concepts for Plume-Slipstream Interactions,” Presented at the 45th Semi-Annual Meeting of the Supersonic Tunnel Association, Sandia Laboratories, Albuquerque, New Mexico, April 13-14, 1976

Workshop on High Reynolds Number Research, NASA Langley Research Center, October 27-28, 1976

“Analytical Concepts for the Modeling of Propulsive Jet Plume Interference Effects,” Workshop on Missile and Plume Interaction Flow Fields, Redstone Arsenal, June 6-9, 1977 (2 folders)

“Plume-Wall Shock Interactions in No-Tip Missile Launch Tubes,” Presented at the Forty-Seventh Semi-Annual Meeting Supersonic Tunnel Association, Rockwell International, Los Angeles, California, April 7-8, 1977

Project SQUID Workshop on Engine-Airframe Integration (Short-Haul Aircraft) Naval Academy, Annapolis, Maryland, May 11-12, 1977

“Computer-Based Data Acquisition and Processing Systems for Undergraduate Thermoscience Laboratory,” American Society for Engineering Education, 86th Annual Conference, June 19-22, 1978

Supersonic Tunnel Association Annual Meeting, September 20-22, 1978

American Institute of Aeronautics and Astronautics, Joint Propulsion Conference, Las Vegas, June 18-20, 1979

- “Analytical Concepts for the Modeling of Propulsive Jet Plume Interference Effects,”
American Institute of Aeronautics and Astronautics (AIAA) 17th Aerospace
Sciences Meeting, January 15-17, 1979
- “Analytical and Experimental Investigation of Jet Plume Induced Aerodynamic
Interference Effects in Jet and Rocket Propulsion,” Special Invited Seminar,
Department of Mechanical Engineering, University of Florida, April 16, 1979
Speech Given to the Student Chapter of the AIAA at Texas A&M University, April 3,
1980
- “The Analysis of Secondary Flows for Tube-Launched Rocket Configurations,”
American Institute of Aeronautics and Astronautics 16th Thermophysics
Conference, Palo Alto, California, June 23-25, 1981
Joint ASME/ASCE Mechanics Conference, Boulder, Colorado, June 22-24, 1981
- “Modeling of Transverse Plumes (Control Jets) Exhausting to a Supersonic Adjacent
Flow,” Presented at the 55th Supersonic Tunnel Association Meeting National
Aerospace Laboratory, Amsterdam, the Netherlands, April 27-29, 1981
Eleventh Southeastern Conference on Theoretical and Applied Mechanics (SECTAM
XI), April 8-9, 1982

Box 4:

- A Symposium on Rocket/Plume Fluid Dynamic Interactions Research Notes and
Correspondence, April 5-7, 1983
Symposium of Fluid Dynamics in Honor of Helmut Korst, Department of Mechanical
and Industrial Engineering, Volume One, UIUC, April 26-27, 1984
TV Lecture, University of Florida, January 10, 1984
“The Wind Tunnel Simulation of Propulsion Jets and their Modeling by Congruent
Plumes including Limits of Applicability,” AIAA 22nd Aerospace Science
Meeting, January 9-12, 1984

Consulting

- Caterpillar Tractor Company Final Report Consultant Agreement of November 22, 1957
Approximate Calculation of Two-Dimensional Compressible Turbulent Boundary Layers
with Pressure Gradient in the Free Stream, Allison Division of General Motors
Corp., July 29, 1958
“Cooling and Drag Characteristics of a Small Ram-Jet C-D Nozzle,” Allison Division of
General Motors, March 16, 1959
“Leakage Flow and Thrust Correction Evaluation for Labyrinth Seals on Thrust Test
Rigs,” ADM 60-119, August 3, 1960
Arnold Air Force Station Research Branch Rocket Test Facility, 1961
Convair 990 Model 30 Drag Reduction Program, July 1961
Convair, 1961-1962
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H.H. Korst Consulting Company Employee Monthly Time Record Tally Sheets, 1961
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 Rocketdyne Contracts and Reports, 1965
 Correspondence, General, 1965
 "Aerodynamic Analysis of Exhaust Systems: Report No. One," Caterpillar Tractor Company, 1966
 "Non-Isoenergetic Turbulent Jet Mixing Between Two Compressible Streams at Constant Pressure," NASA Contractor Report, April 1966
 McDonnell Douglas Corporation Consulting, 1968
 Ejector Performance Analysis, Rocket Research Corporation, 1969
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 "Experimental Determination of Friction Drag Characteristics for Tube Walls at Transonic and Supersonic Free Stream Velocities", Rocketdyne, a Division of North American Rockwell Corporation, June 22, 1969
 Rocket Research Corporation Consulting, 1969
 Redstone Arsenal Consulting, 1971

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 "Study into Operational Characteristics of Recoilless Rifles Mounted on Army Helicopters," Watervliet Arsenal 1972
 Non-Steady Plume, Rock Island Arsenal, 1972-1974
 AG-Rain, Inc. Consulting, 1973
 Rocketdyne Correspondence, 1973
 Battelle Columbus Laboratories Consulting, 1974-1982 (2 folders)
 Impulse Noise Reduction, Olin Energy Test Range, 1975-1976 (2 folders)
 Driall, Inc. Consulting, 1976
 Argonne Laboratories, 1979
 Langley Field Space Shuttle, May 13, 1980
 Defense Advanced Research Project Agency, 1981

Research Materials

Transonic and Supersonic Flow of a Real Fluid at Abrupt Increases in Cross Section, Quarterly Progress Report, August-November, 1952
 Folder One
 Folder Two
 Folder Three
 Hypersonic Separated Flows Correspondence and Research Notes, 1958-1959
 Abstract: Energy Transfer Mechanisms in Fully Separated Flows, Technical Notes and Correspondence, 1963
 "NOVA Project Oriented Analytical Study of Booster Rocket Concepts," NASA

Proposal, April 1963

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Basic Research Investigation on Flow Mechanism and Heat Transfer in Separated Flows
Proposal for Renewal of Contract, 1963-1964

Project Reports, 1964

“Basic Research Investigation in Flow Mechanism and Heat Transfer in Separated Flows”

NASA Grant NsG-13-59/14-05-001

Correspondence, 1964

Status Reports, 1964-1966

Box 6:

“Rocket-Diffuser Test,” 1965

Compressible Non-Isoenergetic Turbulent Jet Mixing between Two Streams at Constant
Pressure

Jet Boundary Reattachment Data, June 6-7, 1967

Commentary on Published Articles, Crown AIAA and Tom Sinnot, 1968

Unsteady Shock-Wave Study Preliminary Experimental Data, November 11, 1972

“Analytical and Experimental Investigation of Blast Wave Abatement (with Special
Emphasis on Structural and Physiological Effects,” Rock Island Arsenal, 1974

“Heat Transfer Near Points of Reattachments of Two-Dimensional Incompressible Flow
Past a Step,” May 1976

Department of Transportation Proposals, 1975-1978

“Internal and External Ballistics of Missiles with Special Consideration of Jet Plume
Interference Effects During Launch and Free Flight Phases,” US Army Research
Office Proposal, 1975-1976

Slipstream Boundaries, 1976

Blow-by Analysis Notes, 1978

Pressure Distribution of Matching Plumes, November 1978

SPIKE, 1979

ARO Research Review, September 16, 1980

Modeling of Transversal Jet Thrust, 1980

Research Notes, Joint Army Navy NASA Air Force (JANNAF), Huntsville, Alabama
July 8, 1980

“Interference and Interaction Effects of Transverse Supersonic Plumes (Control Jets) on
the Aerodynamics of Supersonic Flight Vehicles,” Research Proposal submitted
to the National Science Foundation (NSF), 1981

Shuttle Base Pressures, 1981

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Research Projects, 1982-1983

Undated Research Materials

Air Nozzle(s)- Air (2 Design Prints for Range Matching- Argon)

Approximate Plume Shape Near Nozzle Lip (Kutta-Runge)

Argon Nozzle
 Folder One
 Folder Two
 Base Pressure Notes
 Blast Wave Research Notes
 Folder One
 Folder Two

Box 7:

Bound Louzer 68/69, Thomas Buffeting, Low Speed Stall, Droup Modication
 Component Evaluation of Railroad Engines and Cars” Research Proposal, AAR Affiliate
 Development of Equations for Dilution of Brine in Ocean
 Diaphragm Rupture – Parameter Identification
 Free Jet Boundary Axially Symmetric Flow, Method of Characteristics, W.L. Chow
 K-W Puzzle
 Korst Work- Original
 Langley Plume
 Linear Profile Growth, Laminar Mixing Region, Mixing Region Turbulent

Box 8:

Machined Nozzle
 Multi-Manometer Photographs
 Natural Convection from Cylinder (horizontal or vertical), Finite Element Scheme (non-steady), Research Notes
 Notice of Research Projects Science Information Exchange, Smithsonian Institute, 5
 Proposals
 Plume Boundaris Diff. Flows Notes
 Prospective Thermal Analysis Experiments, Reports, Proposal, Johannesen
 Room Heating - Non Steady
 Shock Attenuation
 Streamline Curv. Method
 System Blow Down Notes
 Test of Shock Mach Data
 Transonic Flow Data
 “Utilization and Development of Computer Capability based on Coast Techniques for
 Drag
 Work Statistics, Inst. Airfoil Motion, Transonic Separation Bubble-Model, Low-Speed
 Separation

Brochures

Arnold Engineering Development Center (AEDC) - Test Highlights - Air Force Systems
 Command, Spring 1977
 Saturn V Apollo brochure - Lunar Orbit Rendevous Mission

