VARIOMETER

PUBLISHED TO RECORD

THE UPS AND DOWNS

OF THE

KANSAS SOARING ASSOCIATION

Editor: Tony Condon

Volume LVI **October 2016** **Number 10**

Robert Estagin - Solo!

KSA CALENDAR

November 5th - Fall Work Day - Sunflower

November 12th- KSA Meeting - Soaring Weather

December 10th - KSA Meeting

2017

January 14th - KSA Banquet - Kansas Cosmosphere - 6 PM

January 21st-22nd - SSF Flight Instructor Refresher Clinic - Wallis, TX - Info here

February 11th - KSA Meeting - My evolution at Sports Class Nationals - Andrew Peters

March 11th - KSA Meeting - Badge Flying

March 19th - 25th - FAI Sailplane Grand Prix - Orlando, FL

April 8th - KSA Meeting - Safety Meeting

June 5th - 14th - 15 Meter, Open, Standard Nationals - Cordele, GA

June 21st - 30th - Club Class Nationals - Hobbs, NM

Jun 29th - July 16th - 2nd FAI World 13.5m Class Gliding Championship - Szatymas, Hungary

July 3rd - 7th - Women's Seminar - Chilhowee Gliderport - Benton, TN

July 15th - Kansas Kowbell Klassic

August 1st - 10th - 18 Meter Nationals - Uvalde, TX

August 28th - September 2nd - Region 10 Championship - Waller, TX

September 24th - Adventurous Babes Society

October 1st - Adventurous Babes Society Rain Date

October 7th - EAA Fly-In Newton, KS

Nov 26th - Dec 8th - 2nd FAI Pan-American Gliding Championships - Santa Rosa de Conlara, Argentina

Election Results

Congratulations to **Tony Condon**, **Brian Silcott**, **Bob Blanton**, **Bob Hinson**, **Steve Leonard**, **Matt Gonitzke**, and **Brian Bird** for being re-elected to the KSA Board. Thanks for serving!

Aaron Maurer will be collecting travelling trophies in November. If you have one, contact him to arrange delivery.

aaron9975@gmail.com

Notes from the President

Greetings KSA! With such a nice warm fall, we should be able to enjoy an extended flying season. Don't be shy about calling towpilots if it looks like a good flying day is coming up. We can still accomplish a lot of training objectives, stay current, and have some fun this "winter".

The November meeting will once again be held at WSU. **Brian Bird** is going to lead a discussion about weather for soaring pilots. SSA Calendars will be available and you should be able to reserve your spot for the KSA Banquet.

Speaking of weather, I notice that the NOAA is predicting above average temperatures and below average precipitation for us for the next 90 days. I can only hope this trend continues!

The Annual KSA Awards Banquet will be moving back to the Cosmosphere this year! The date is January 14th at 6:00 pm. If you can't get your seat reserved at the November or December meetings, contact KSA Treasurer **Brian Silcott,** brian.silcott@gmail.com .

I look forward to seeing you at Sunflower!

Tony

Call for SSF Directors

The Sunflower Soaring Foundation is a 501c3 organization formed in 2013 to operate the Sunflower gliderport, promote the sport of soaring, and administer the Bill Seed Soaring Scholarship. The foundation is governed by a board of directors that serve a 1 year term. Anyone who has been a member of KSA and/or WSA for 2 years is eligible to serve as a director of the foundation.

Currently the foundation is looking to fill the 8 director positions for 2017. The directors meet approximately 6-8 times during the year to conduct SSF business. This includes the work days, the scholarship, facilities maintenance, demolition of the tower building, and various other projects.

If you are interested in serving, please contact **Andrew Peters** or **Mike Davis** no later than Wednesday November 9. If you need more information, just ask one of the current directors (**Bob Holliday**, **Tony Condon**, **Jerry Boone**, **Andrew Peters**, **KC Alexander**, Don **Jones**, **Mike Davis**, **Matt Gonitzke**).

Fall Workday

The fall workday is scheduled for Saturday November 5th at 9:00 am. There are several projects planned, including fixing doors on the tee hangar, winterizing the bathrooms, cutting down trees, etc.

Lunch will be provided and the day will end when the work is done or by 4:00 pm.

Rain date is scheduled for November 19th

Sunflower Seeds

October 1st: **Dave Wilkus** (SR) and **Mike Orindgreff** (CAT) flew with **Mike Davis** running the line and **Brian Bird** towing

October 2nd: **Dave Wilkus** (SR) and **Mike Orindgreff** (CAT) were once again flying. **Mike** enjoyed about 1.5 hrs. **David Kennedy** made two flights in the 2-33. **Paul Sodamann** towed

October 22nd: **Bob Holliday** towed, **Tony Condon** instructed **Robert Estagin** and **Paul Sodamann** in the 2-33. **Chad Wille** flew his Nimbus 3 on a few test flights. **Eddie Estagin** and **Dave Wilkus** ground crewed. **Mike Orindgreff** worked on F8 after bringing it back from California. **Dave Pauly** was seen. **David Kennedy** did a few flights in the 2-33.

October 27th: **Bob Holliday** towed. **Robert Estagin** took training from **Tony Condon**, finishing up with his first solo. Congratulations! **Mike Davis** made a few flights and helped on the ground. **Eddie Estagin** also helped on the ground and Maggie Estagin observed.

EAA Fly In

Around sunrise on October 8th, **Robert** & **Eddie Estagin**, **Tony Condon,** and **Jerry Boone** gathererd at Sunflower. We were treated to the sight of sunrise at the glierport, not something we are used to seeing! **Jerry** prepped the 175 while the rest of us got the Grob ready. Launch was shortly after sunrise with a destination of Newton, KS for the EAA Fly-In. We hoped to give a few rides, promote the sport, and have a good time.

The cross country aerotow was perfectly smooth and easy. **Tony** and **Robert** flew the Grob while **Jerry** towed and **Eddie** drove with some supplies for the ground portion of our “attack”. That mostly being some flyers, a table, chairs, and the KSA flag.

The event happened to take place on one of the finest flying weather days of the fall, with clear skies, reasonable temperatures and hardly any wind. We enjoyed standard flight breakfast fare and then set up shop. **Tony** gave a friend a quick ride which drummed up interest and soon we had a steady flow of paying passengers while **Eddie** worked the booth. We had been joined by **Jimmy Prouty** who along with **Robert** did ground crew duties. When **Jerry** wasn’t towing he would work the crowd from the Public Address booth, telling them about the sport of soaring and the club.

We gave several rides then broke for lunch, resuming shortly after. All in all we had 7 paying rides. A special treat was that longtime KSA member **John Peters** was in attendance for the fly in and had never flown the Grob. He and **Tony** enjoyed a nice soaring flight after lunch while waiting for the next passenger to get ready.

Tony claimed an unofficial win in the Spot Landing Contest. Since he did not attend the mandatory pilots briefing he could not be an official competitor but when the line was drawn on the runway the temptation to land right on it was just too large. It was great fun watching the other competitors in their airplanes and gyrocopters and comparing techniques.

There was quite a lot of traffic while the EAA guys flew several volleys of Young Eagle flights throughout the day but it wasn’t too tough to work together. I think everyone involved had a good time and there was a really good turnout for this large annual aviation event.

The aerotow home was a little bumpy but not too bad. **Robert** got to do most of the flying back. By the time we got back around 5 PM the daily action at Sunflower was over. Everything was put away and we all headed home.

I should mention that **Bob Blanton** is a major organizer of this event and we are already invited back for next year. It’s a great way to showcase our sport and advertise our club to the local pilot population. Hope you can make plans for next year!

Sunflower sunrise - **Eddie Estagin** photo

Checking out the Grob - **Jimmy Prouty** photo

Reprinted from July 1989 *Technical Soaring*

THE INFLUENCE OF DESIGN PARAMETERS ON GLIDER TRAILER TOWING BEHAVIOR

by Nelson E. Funston

Structural Dynamics, U.S.A.

Presented at the XX OSTIV Congress, Benalla, Australia (1987)

Summary

A computer engineering model simulation can predict the dynamic lateral-sway behaviors of various combinations of tow vehicles (trucks, autos, vans, motorhomes, etc.) and trailers.

A model has been developed to analyze various combinations of trucks and trailers owned by the U.S. Forest Service and operated by a diversity of personnel. A method of selecting the correct combinations of trucks and trailers was needed by, and developed for, the U.S. Forest Service to make trailer use and selection most efficient within the limits of safety and practicability.

This model has also been used by the author to analyze the in-motion lateral-sway behavior of vehicle/trailer configurations typically used to convey and store gliders and is the subject of this paper.

The effects of the key design parameters (such as trailer wheelbase, weight and yaw inertia, weight distribution, hitch weight, tire lateral stiffness, and tow vehicle weight and geometry) have been analyzed to determine their influence on trailer lateral-sway behavior. These may be used to provide a rational basis for the decisions that are eventually made in the trailer design process. Recommendations for changes of current designs of trailers are made which will enhance the safety and dynamics of trailer towing.

Glider trailer configurations with weights over 800 Kg. and hitch-to-CG lengths of less than 5m (which includes most of today's configurations) are marginally safe when towed by medium and small vehicles (under 1800 Kg.), regardless of

whether front-wheel or rear-wheel drive. Improvements of lateral sway dynamics will result from the following changes to the trailer:

(1) Increase: Hitch length, hitch weight, tire size, or
(2) Reduce: Speed, yaw inertia, weight.

A. Introduction

Glider trailers serve a variety of functions, including service as a portable hangar for the disassembled glider, a rigging platform with convenient fittings for assembling the glider, and a convenient conveyance that can be towed safely by a variety of vehicles.

Over the last 10 years or so, in the U.S., trailer characteristics have become more uniform as a result of the importations of numerous trailers designed and purchased in Europe. The most common loading of a glider in these designs is with the wing roots and fuselage loaded forward; glider assembly is performed on the trailer's tail gate, and appears to be one of the key design criteria.

Over the past three years, the author has conducted analytical studies and field tests for the U.S. Forest Service to evaluate and to determine the suitability of various combinations of trucks and trailers for safe and economical towing, and to facilitate tow vehicle selection by personnel. Some of the analytical techniques developed and validated in the Forest Service study are used here to evaluate the lateral-sway dynamics of combinations of trailers and tow vehicles most commonly used to convey gliders.

For the purposes of this paper only, the key equations of motion from Reference (1) are included herein. This presentation emphasizes results of the evaluation of particular vehicle/trailer combinations and then draws conclusions concerning the handling characteristics of today's trailers.

B. Analysis techniques

Two sets of equations are presented:

(I) The simple case of a trailer only with no lateral hitch motion possible, which is equivalent to a trailer being towed by an infinitely large and rigid tow vehicle (Equations 1 through 4); and

(II) The case of a trailer loaded in a way that results in no dynamic forces at the trailer hitch of the towing vehicle (Equation 5). This case results when the wheels are located at the center of percussion.

Analysis of these two simple cases gives insight into the relationships of the design parameters which are applicable to a range of real-world combinations.

The equations of motion which formed the basis of the analytical results subsequently presented consider the tow vehicle and the trailer as rigid bodies connected at the hitch. The equations of motion used for the computer solutions include degrees of freedom for the truck yaw, and lateral motion, and the trailer/truck articulation angle. The forward speed was constant, the tires had linear lateral stiffness (no skidding).

Equations of Motion

(Case I) Trailer only dynamic equations of motion

The trailer is analyzed as a one degree of freedom system (yaw only). Based on the nomenclature of Figure (1), the equation of motion, for the trailer only, is written in the yaw

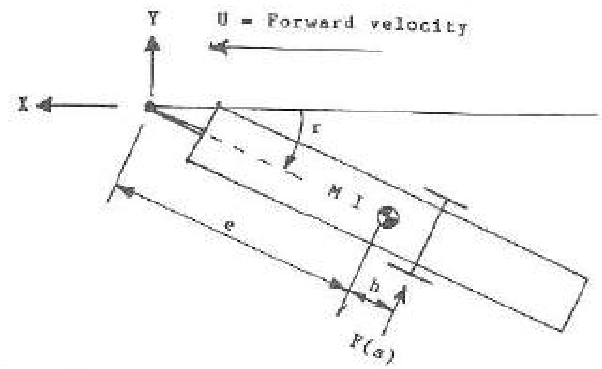


FIGURE 1. Trailer schematic for deriving equations of motion.

direction for the case in which the hitch is considered frozen from lateral motion.

$$I'^*\ddot{r} + F(s)^*(e+h) = 0.0 \qquad (1)$$

Where:

- I' = $I_o + M^*e^2$ (Yaw inertia about hitch)
- I'_o = Trailer yaw inertia about its CG
- r = Trailer sway (articulation angle with truck)
- $\ddot{r}$ = Rotational acceleration
- $F(s)$ = Lateral force at tire due to tire side slip angle $F(s) = C^*s$
- C = Tire lateral force coefficient as a function of sideslip, units of N/rad

The sideslip angle, s, can be expressed in terms of the sway (r) and sway velocity ($\dot{r}$):

$$s = (e+h)^*\dot{r}/U + r$$

then, the equation of motion (1) can be re-written as:

$$O = I'^*\ddot{r} + (C^*(e+h)^2/U)^*\dot{r} + (C^*(e+h)^*r \qquad (2)$$

From the above equation, the expressions for trailer response resonant frequency, f_n, and for the damping ratio, B, as a percent of critical can be written. Critical damping is the smallest damping for which perturbations do not oscillate but return gradually to zero.

$$f_n = \sqrt{C^*(e+h)/I'}$$
$$B = C^*(e+h)^2 / [2^*U^*\sqrt{C^*(e+h)^*I'}] \qquad (3)$$

$$B = \frac{1}{2^*U} \sqrt{\frac{C^*(e+h)^3}{I'}} \qquad (4)$$

These equations give an initial assessment at trailer behavior. Figure (5) tabulates the rigid-hitch lateral damping of the trailer configurations used in this paper. Equation (4) gives straightforward insight of the parameters that affect lateral stability and their relative importance. The most critical factor is hitch length since damping is proportional to the 1.5 power of the hitch length.

Speed is the second most critical factor with damping varying inversely to the speed. Larger tire lateral stiffness increases damping, and larger yaw inertia decreases damping, by the square root of the change.

With a practical tow vehicle, the influence of the parameters (hitch length, speed, tire stiffness) is often even more pronounced.

(Case II) No hitch dynamic loads

By adjusting the weight distribution and geometry, a tongue weight can be determined, which will result in no lateral dynamic hitch force at all. This is achieved by solving for the hitch lateral dynamic force in terms of the other parameters of the trailer and setting it equal to zero. If the pitch inertia is equal to the yaw inertia, a side benefit of setting the lateral dynamic hitch forces equal to zero is that the vertical hitch dynamic forces will also be zero. A very happy situation results since the pounding induced on the hitch and the jerking of the tow vehicle by the trailer, especially heavy ones are totally avoided.

Setting up equations for the lateral forces at the hitch and rearranging yields the optimum tongue weight ratio.

$$T/W = 0.5 - \sqrt{(0.25 - (R/(e+h))^2} \quad (5)$$

Where:

- T = Tongue weight
- W = Trailer weight
- R = Trailer radius of gyration $\sqrt{(I_o/M)}$
- M = Trailer mass (W/g)

The merit of designing and building a trailer to satisfy equation (5) is that the size of the tow vehicle, small or large, does not matter, as there are no lateral or vertical dynamic loads at the hitch.

D. Criteria for trailer behavior evaluation

Sway damping of at least 25% at a speed of at least 100 Km/hr is considered necessary for satisfactory overall towing performance. While 100% damping is possible (highway semi-trucks, for example), it is not very practical for glider trailers; 25% damping decays to less than 5% of the perturbation in two cycles. Figure (2) shows the decay behavior of various values of damping.

Values of damping lower than 25% can be occasionally tolerated, but safe behavior mandates conservatism in order to cover cases of unusually adverse circumstances, such as loose gravel, slick or rutted roads, or traffic surprises.

Equation (6) is an expression for the decay of motion per cycle as a function of the damping. Figure (2) provides a visual representation of the decay of motion as a function of time for three different damping values.

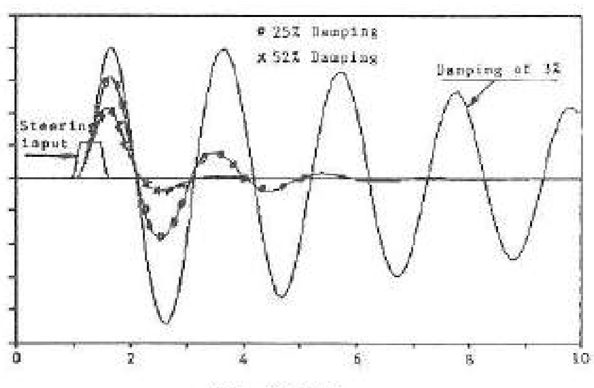


FIGURE 2. Variously damped articulation responses to steering input.

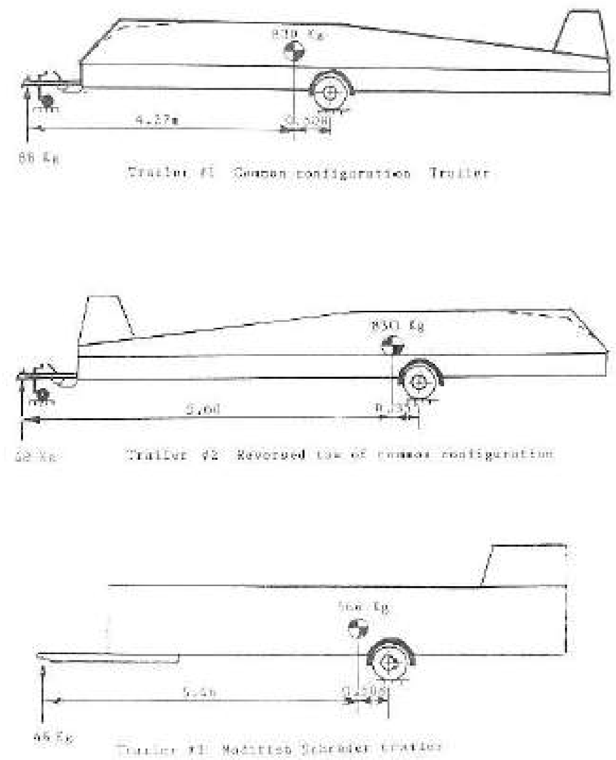


FIGURE 3. Schematics of glider trailers used in this study.

$$Y_n = Y_0 * e^{(-2*\pi*B*n)}$$

Where:

- Y_n = Is the amplitude of the n-th cycle after an initial perturbation of Y_0
- B = The damping ratio
- e = Base of natural logarithms

E. Vehicles and trailers analyzed

Three diverse tow vehicles depicted figure (3) in combination with these specific trailers depicted in figure (4) were selected for this study: (Car #1), a 950 Kg small front wheel drive automobile, (truck #2) a 1590 Kg small-size truck, and (truck #3) a 3800 Kg medium-size truck loaded with a camper.

The trailers were picked to demonstrate particular points: hitch weight, trailer wheelbase and weight distribution, trailer weight, and tire influence. Trailer #1 is a typical manufacturer's glider trailer, 830 Kg. (loaded), with a short wheelbase. Trailer #2 is a typical glider trailer, 830 Kg., and towed from the opposite end. Trailer #3 is a Schreder glider trailer modified to reduce weight (566 Kg.) and to lengthen the tongue.

F. The influence of analysis parameters

Hitch Weight

Hitch weight is a powerful parameter and the easiest parameter to vary in order to control lateral sway dynamics. Figures (6) and (7) are plots of the influence of tongue weight on sway damping for several different tow vehicle and trailer combinations. If the tow vehicle is able to handle any amount of tongue weight, sway damping can always be controlled.

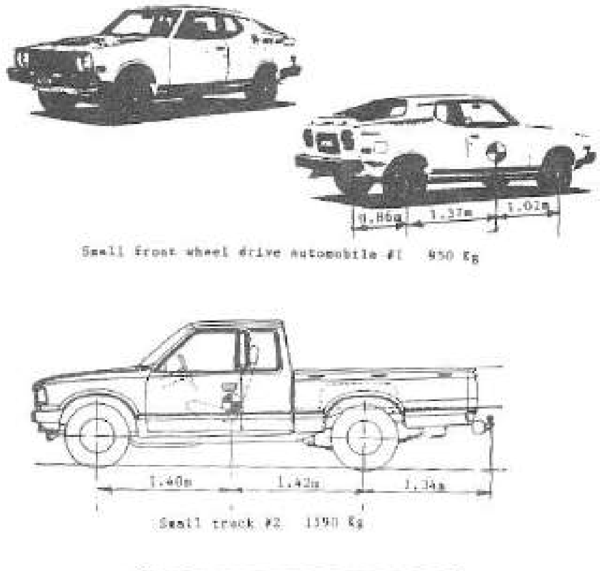


FIGURE 4. Schematics of tow vehicles used in this study.

Trailer Wheelbase and Weight Distribution

Trailer weight distribution can significantly influence the amount of tongue weight required to control sway damping. Figures (6) and (7) are for the three different vehicles towing

TRAILER PROPERTIES

	Weight Kg	I Yaw Inertia $Kg\text{-}m^2$	CG to Hitch m	Tire Stiff deg^{-1}	* Damp % Cr	** Hitch Load
#1 Typical Trailer	830	3500	4.27	0.135	0.29	240
#2 Reversed Trailer	830	3680	5.60	0.135	0.35	120
#3 Modified Schreder	566	2520	5.46	0.135	0.38	84

* Damping for 100 Km/hr speed with "infinite" mass truck
** Hitch load for zero dynamic hitch forces - Kg

TOW VEHICLE PROPERTIES

	Weight Kg	I Inertia $Kg\text{-}m^2$	Wheel Base m	Weight Distr. Dry	Over Hang m	Tire Stiff deg
#1 Small Car	950	1200	2.39	58/42	0.86	0.165
#2 Small Truck	1590	1800	2.84	50/50	1.34	0.165
#3 Heavy Truck	3790	5890	3.14	33/67	2.30	0.140

FIGURE 5. Physical properties of study vehicles.

short and longer wheelbase trailers, respectively. At heavier tongue loads, little difference results between a small tow vehicle (950 Kg.) (car #1) and a larger tow vehicle (3800 Kg.) (truck #3). Also, tongue weight is not as critical or as sensitive a parameter for large tow vehicles as for small cars.

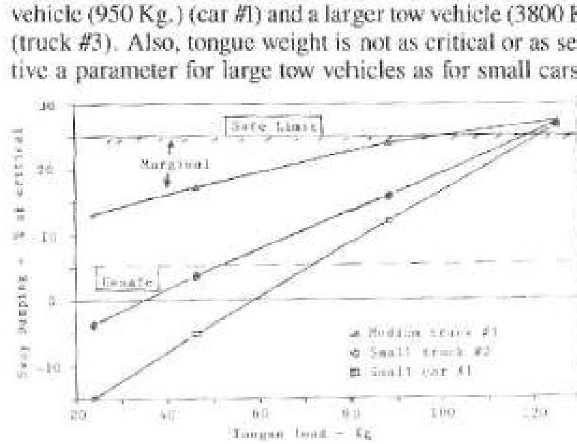


FIGURE 6. Sway damping of trailer #1 towed by three vehicles at 100 km/hr.

The sway dynamics of trailers with the longest wheelbase provides the most benign towing characteristics. By keeping the weight as far aft as possible and/or using a long tongue, benign conditions are produced with a lighter tongue weight, especially for small cars. The ultimate trailer typifying this condition in the U.S. is a compact gravel and sand box with a small yaw inertia placed directly over the trailer wheels connected to a long tongue. The result is a trailer with high damping of over 100% with a low tongue weight of less than 5%.

Trailer Weight

Weight is best kept to a minimum; however, weight is not a major culprit by itself in relation to lateral sway. However, heavy loads put a greater stress on brakes and power plant. Adding weight to a trailer ahead of the wheels can improve the lateral damping. For example, basic trailer #1 towed by small car #1 at 100 Km/hr has a basic damping of 3%. By adding 70 Kg of weight at various locations ahead of the wheels, the damping is improving from 3% to 6% with the weight over the wheels and to 8% with the weight placed half way between the hitch and the wheels.

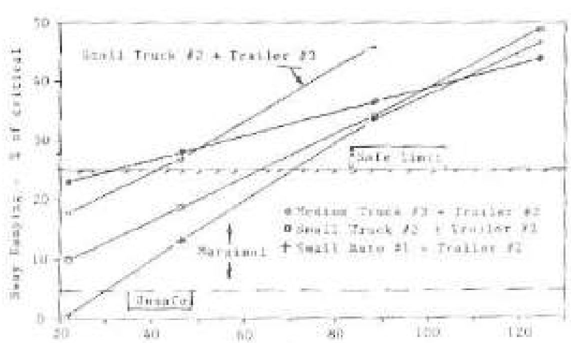


FIGURE 7. Sway damping of trailer #2 towed at 100 km/hr.

Yaw Inertia

Yaw inertia aggravates lateral sway. Since glider payloads are long in relation to their weight, not much can be done about this high inertia except to keep the total weight of the trailer as low as possible and not to add mass to the ends of the trailer. "Extra" weight such as spare tires and tool boxes should be placed near the wheels.

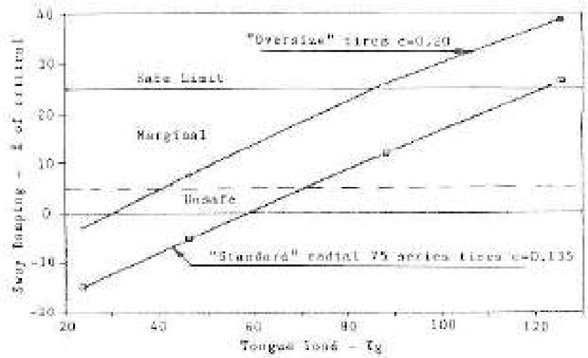


FIGURE 8. Influence of trailer tire stiffness on sway damping, small car #1 towing trailer #1.

Tire Influences

Tire data for this paper were taken primarily from Reference (4). Tire lateral stiffness has a significant impact on trailer lateral sway. Figure (8) is a plot of the articulation angle damping for car #1 pulling trailer #1 at 100 Km/hr at various tongue loads with both standard P165/75R13 tires (c=0.135) and high stiffness low profile tires, perhaps 220/55R390 (c=0.2). The higher stiffness (low profile) tires improve the sway damping by a nearly constant value of 12% across the entire tongue load range. This is especially significant if the damping is near zero in the first place.

By contrast, changing to higher stiffness tires on the tow vehicle has very little effect on trailer lateral sway. However, tire stiffness and weight distribution have a significant impact on the oversteer tendency of the tow vehicle. Low tire stiffness and/or overweight on the rear wheels can cause a dangerous oversteer condition independent of the trailer. (Tow vehicle oversteer is not addressed by this paper in detail.)

Of the three tow vehicles analyzed, the medium truck (3) has a high rear-to-front load ratio and is marginal at 100 Km/hr from an oversteer standpoint. If the stiffness of the rear tires is reduced 15%, the vehicle is unstable. The front wheel drive automobile (car #1) is the most stable because of its weight distribution. For this reason and for the short hitch overhang behind the rear wheels, front wheel drive automobiles make the best tow vehicles assuming other factors are equal.

Tire lateral stiffness for typical tires is plotted in Figure (9). The lateral force generated by a tire is plotted as Kg side force per Kg of vertical force per degree angle of attack. In the normal load range of 50% to 100% of loaded range, low-profile (55 and 60 series) tires have lateral stiffness of up to 40% higher than standard 75 or 80-series radials. Bias ply tires generally have 25% to 30% lower lateral stiffness than radials and are not recommended for use on glider trailers. There is

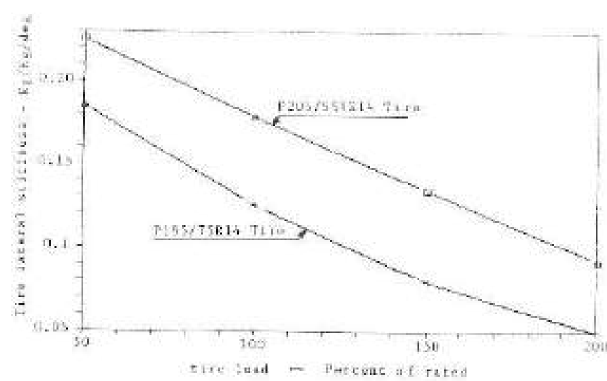


FIGURE 9. Lateral stiffness of two types of tires as a function of load.

no point in giving up that much lateral sway damping for such a small price.

Speed

Figure (10) plots the influence of speed on trailer lateral-sway damping. Reduction of speed always improves sway damping. For the case of light truck #2 pulling trailer #1, reducing speed to 82 Km/hr allows the damping criteria of 25% of critical to meet at 88 Kg tongue loading or 66 Km/hr at 46 Kg tongue load.

G. Conclusions and recommendations

The major factors affecting trailer lateral stability are;
(1) Hitch length to the trailer CG
(2) Tongue weight (position of the wheels aft of the CG)
(3) Speed
(4) Yaw inertia of the trailer
(5) Trailer tire lateral stiffness
(6) Ratio of trailer to tow vehicle weight

Glider trailer configurations with weights over 800 Kg. and hitch-to-CG lengths of less than 5m (which includes most of today's configurations) are marginally safe when towed by medium and small vehicles (under 1800 Kg.), regardless whether front-wheel or rear-wheel drive.

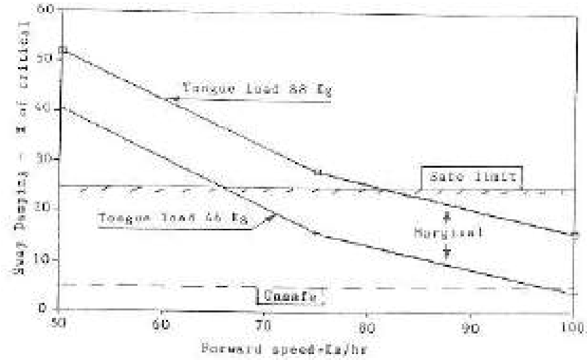


FIGURE 10. Influence of speed on sway damping, small truck #2 towing trailer #1.

Techniques for improving trailer lateral-sway dynamics include:

(1) Redesign the trailers to tow from the "long" end (i.e., with the glider tail stored forward)

(2) Use a longer hitch on existing designs

(3) Make the trailers lighter, keep mass near the CG

(4) Use larger tires and/or low profile tires

(5) Increase tongue weights

(6) Tow with larger trucks

(7) Drive more slowly

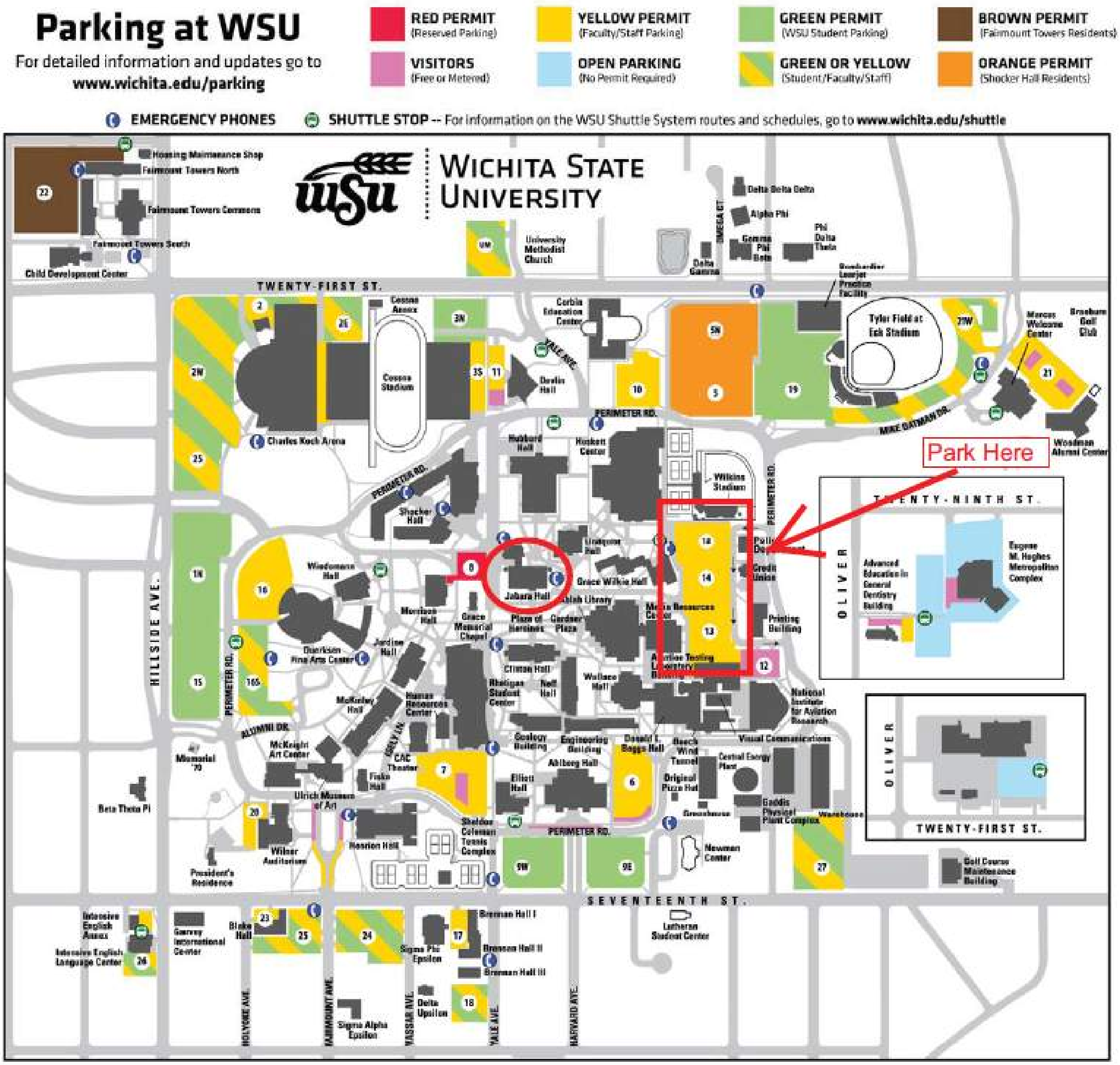
The choice of compromises is left to the designer, manufacturer, and the pilot or user.

H. References

(1) Ellis, J.R.	1969	Vehicle Dynamics, London Business Books
(2) Funston, Nelson E. Girard, Joseph D.	1984	Gooseneck and Pole Trailer Study, Structural Dynamics, Contract No. 53-9JA9-3-398, U.S. Dept. of Agriculture Forest Service, (1984)
(3) Funston, Nelson E. Hodges, Henry C. Jr.	1984	Safe Tow Load Tests of Truck/Trailer Combinations, Nevada Automotive Test Center, Contract No. 53-9JA9-4-487, U.S. Dept. of Agriculture Forest Service
(4) Tapi, George A.	1983	Extending Tire Testing, Calspan Corp., Contract No. DTNH22-81-C-07100, U.S. Dept. of Transportation.

<u>November KSA Meeting</u>

We will be meeting at Jabara Hall on WSU's campus, Room 127. Thank you to **Aaron Maurer** for arranging this for us. The room is located on the first floor of the building adjoining the main lobby. The map below shows where to park and where to find the building. See you there. November 12th at 6:30 PM



RULES FOR KSA FLYING AWARDS, 2016

Unless otherwise noted, the following applies to all awards:

Awards are to be made for flights with departure points in Kansas.

All distance and speed flights must start at an altitude of 1000 meters (3281 feet) or less AGL, except the Kowbell Klassic.

No altitude gate is required.

Handicaps, when they are used to evaluate competing pilot accomplishments while flying different sailplanes, will be the current handicaps used by SSA. For sailplanes without a SSA handicap, a handicap will be established by the KSA Board of Directors. For the 2014 season, the SSA 2014 Handicap list, as amended/added to below, will be used (the 2014 list is available on the SSA web page, www.ssa.org):

Schreder HP-18 - 1.02

When handicaps are used, an additional factor will be applied to any flight if the aircraft is carrying inflight disposable ballast (water) at takeoff. The additional factor will be multiplying the original handicap by .92

Turnpoints will be photographed

The camera does not need to be mounted. Handheld is OK.

No specific film type or processing is required.

Only photographs pertinent to the flight need be submitted. An uncut film strip is not required.

Contest style turnpoint photos can be used for any turnpoint in the KSA turnpoint book.

FAI style photos can be used for any turnpoint.

GPS ground tracks may be submitted in lieu of photographs for any task. The track must have the date and pertinent times displayed on it. It is preferred that the track be submitted in the IGC format. On declared tasks, the ground track must show that the flight path went around the outside of the turnpoint. On pilot selected tasks, the ground track must show that the glider passed within ¼ mile of the turnpoint, in the location for a proper turnpoint photo.

Speed tasks- Allowed methods for time recording:

Start/Finish gate (ground timed)

Data back photos of start/finish

Pilot timed task

Wooden Wings Award

Awarded for the longest flight in a wooden winged sailplane. The task may be free distance, or if turnpoints are to be used, they must be declared in advance of the flight and in the sequence to be used. The task declaration may be written or verbal. The turnpoints need not form a closed course. A remote finish point can be used.

If the course is abandoned before all turnpoints are made, the flight will be scored as the distance for the achieved turnpoints, plus the distance to the next declared turnpoint, minus the distance from the landing point to the next attempted turnpoint, but not less than the distance to the last achieved turnpoint.

Mamie Cup

Awarded for the greatest distance flown from a Kansas departure. The task may be free distance, or if turnpoint are to be used, they must be declared in advance of the flight and in the sequence to be used. The task declaration may be written or verbal. The turnpoints need not form a closed course. A remote finish point can be used.

If the course is abandoned before all turnpoints are made, the flight will be scored as the distance for the achieved turnpoints, plus the distance to the next declared turnpoint, minus the distance from the landing point to the next attempted turnpoint, but not less than the distance to the last achieved turnpoint.

KSA Flying Horse (Silver)

Awarded for the best speed achieved around a 100 KM pre-declared closed course with a maximum of two turnpoints.

Dennis Brown Memorial

Awarded for the best speed achieved around a 200 KM pre-declared closed course with a maximum of two turnpoints.

KSA Flying Horse (Gold)

Awarded for the best speed achieved around a 300 KM pre-declared closed course with a maximum of two turnpoints.

Curt McNay Pilot of the Year

Awarded for the best combined score in four tasks - Duration (not handicapped, but 6 hours max scored), Altitude Gain (not handicapped), Distance, and Speed. Distance and speed are handicapped per SSA Handicaps or the KSA amended/added handicap. Departure point for all flights must be in Kansas. Data must be taken from four flights (i.e., one flight per task).

The distance task may be free distance, or if turnpoint are to be used, they must be declared in advance of the flight and in the sequence to be used. The task declaration may be written or verbal. The turnpoints need not form a closed course. A remote finish point can be used.

If the course is abandoned before all turnpoints are made, the flight will be scored as the distance for the achieved turnpoints, plus the distance to the next declared turnpoint, minus the distance from the landing point to the next attempted turnpoint, but not less than the distance to the last achieved turnpoint.

The speed task must be a closed course of at least 100 KM. However, a predeclared 200 KM (minimum) non-closed course may be used if you are flying a sailplane with a handicap factor of 1.36 or greater (Examples: 2-22, 1-26, 2-33, Swallow, etc.) In this case, a wind correction factor of 15 MPH will be subtracted from the achieved speed prior to scoring.

A score of 1000 points will be awarded the best performance in each task. Each contestant's performance will be ratioed according to the best performance in the task being evaluated. The sum of each contestant's scores will be compared, the highest being the winner.

Charles Henning Award

The intent of this trophy is to encourage more people to fly cross country. All a person needs to compete is a sailplane, a databack camera or a recording GPS, a KSA turnpoint book, and a tow.

1) The cross country task will be a Pilot Selected Task, or PST with a minimum time of 2 Hours.

2) Speed will be determined by the time on course as indicated by the databack camera or recording GPS, or 2 Hours, whichever is greater.

3) Scoring for the trophy will use the SSA handicap or the KSA amended/added handicap.

4) There is no limit on start or finish altitude.

5) The task can consist of any turnpoints in the KSA turnpoint book. Contest style photographs will be used. Turnpoints can be flown in any order. However, if a turnpoint is used more than once, two other turnpoints must be photographed in between. If a GPS Flight log is used for documentation, the flight log must show the glider passed within ¼ mile of the turnpoint, in the location for a proper turnpoint photo.

6) The first picture for the task must include the date. Note: More than one task can be on the same roll of film. Only one task per flight.

7) The second picture for the task will be the start point. This picture determines the Start Time.

8) To finish a task, the pilot must take a picture of the finish point, or take a picture when the glider comes to a stop after landing. If a landing photo is used, the next photo on the film must show the glider and an easily recognizable landmark. No more than 30 minutes should elapse between the landing photo and the glider ID photo. Note: The Start Point and the Finish Point Must be the same point.

9) The winner will be determined by averaging the two best tasks of the year for each pilot. The averaging will be accomplished by adding the two speeds and dividing by 2.

Lead C

Awarded to the pilot or soaring supporter who makes the most noteworthy non-achievement during the calendar year.

Praying Mantis

Awarded to the pilot who makes the most significant advance in his or her soaring ability during the calendar year. To be eligible for this award, the pilot must not yet have his or her Silver Badge at the beginning of the calendar year.

2016 KSA AWARDS

INFORMATION SHEET

Pilot's Name____ Date______________

AWARD	DATE OF FLIGHT	SAILPLANE	SPECIFICS
Preying Mantis (Nominate Someone)			
Towing Operations (Nominate Someone)			
Club Maintenance (Nominate Someone)			
Wooden Wings			Distance Flown
Flying Horse Silver (100 KM Speed Task)			Speed in MPH
Flying Horse Crystal (200 KM Speed Task)			Speed in MPH
Flying Horse Gold (300 KM Speed Task)			Speed in MPH
Charles Henning Memorial Award (two flights required)	Flight 1 Date Flight 2 Date	Flight 1 Sailplane Flight 2 Sailplane	Flight 1 Speed (and time) Flight 2 Speed (and time)
Kansas Kowbell Klassic	Landing Location		Distance
Kansas Kowbell Klassic Kon-solation	Pre-declared Task (must have been completed to count!)		Distance
Mamie Cup			Distance
Pilot of the Year by Handicap Score	Altitude Duration Speed* Distance*		(feet) (hours:minutes) (MPH) (Statute miles)
Rex Hamilton Memorial Award			(Nominate Someone)
Other Significant Accomplish-ments (First Solo, First soar-ing flight, FAI Badge Leg, completion of an FAI Badge, 100th flight, 1000th tow, etc.			

Documentation required for all flights, per rules published in the *Variometer*.

*If you had disposable ballast on board at takeoff of the Speed or Distance flight for consideration, you must put a "B" next to your claimed speed or distance. This affects the handicap number used for evaluating you performance.

"I certify that all flight claims made above were launched in Kansas and are properly documented (does not apply to "Other Significant Accomplishments" category).

Signed____

KSA TOWCARD

TOW NUMBER ____________ START TACH TIME ____________

TOW PILOT ____________

PILOT: ____________

ADDRESS: ____________

____

SAILPLANE: ____________

TOW HEIGHT: ____________

TOW SPEED (MPH): ____________

DATE: ____________

KSA TOWCARD

TOW NUMBER ____________ START TACH TIME ____________

TOW PILOT ____________

PILOT: ____________

ADDRESS: ____________

____

SAILPLANE: ____________

TOW HEIGHT: ____________

TOW SPEED (MPH): ____________

DATE: ____________

KSA TOWCARD

TOW NUMBER ____________ START TACH TIME ____________

TOW PILOT ____________

PILOT: ____________

ADDRESS: ____________

____

SAILPLANE: ____________

TOW HEIGHT: ____________

TOW SPEED (MPH): ____________

DATE: ____________

KSA TOWCARD

TOW NUMBER ____________ START TACH TIME ____________

TOW PILOT ____________

PILOT: ____________

ADDRESS: ____________

____

SAILPLANE: ____________

TOW HEIGHT: ____________

TOW SPEED (MPH): ____________

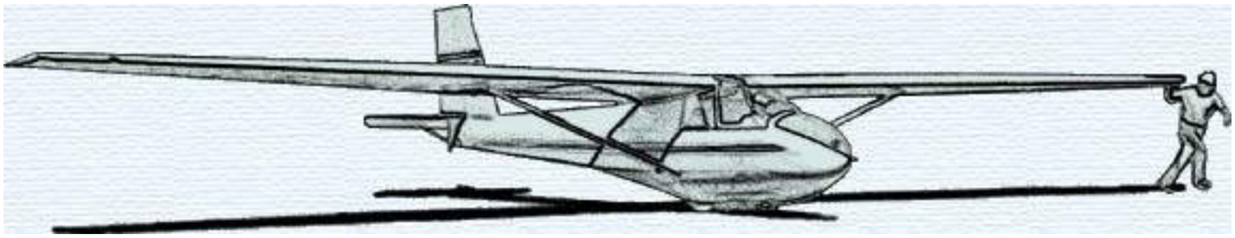
DATE: ____________

KSA VARIOMETER

911 N Gilman

Wichita, KS 67203

abcondon@gmail.com



KSA Meeting

Soaring Weather

Brian Bird

November 12th 6:30

Room 127 Jabara Hall, WSU